

A CONTROLLED COMPARISON OF TWO TREATMENTS FOR
NOCTURNAL ENURESIS: THE RELATIONSHIP BETWEEN
BEHAVIORAL CHANGE AND GENERAL ADJUSTMENT

BY

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Dedicated to my wife, Diane,
who supports my dreams and
helps them become reality.

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TABLE OF CONTENTS

	<u>Page</u>
ACKNOWLEDGMENTS	iii
ABSTRACT.	ix
 CHAPTER	
I INTRODUCTION	1
Rationale for the Study	4
Purpose of the Study	6
Definitions of Terms	7
II REVIEW OF RELATED LITERATURE	10
Overview	10
Theoretical Formulations	12
Genetic Interpretation	12
Organic Formulations	13
Psychodynamic Interpretations	17
Behavioral Formulations	18
Treatment Approaches	20
Counseling or Psychotherapy	21
Pharmacotherapy	23
Behavioral Treatment	27
Self-Concept	38
Emotional and Behavioral Correlates	44
III METHODOLOGY	53
Subjects	53
Hypotheses	55
Instrumentation	56
Child Self-Report Measures	57
Piers-Harris Children's Self- Concept Scale	57
What I Think and Feel: A Revision of the Children's Manifest Anxiety Scale	61
This Week	63
Peabody Picture Vocabulary Test	64

CHAPTER	Page
III METHODOLOGY (Continued)	
Parent-Report Measures	67
Tolerance Scale for Enuresis	67
Nuisance Scale for Enuresis	68
Personality Inventory for Children	69
Behavior Problem Checklist	74
Procedures	77
Collection of Baseline Data	77
Treatment Format	78
Collection of Posttest Data	81
Analysis of the Data	82
IV RESULTS	87
Statistical Description of the Sample	87
Pre-treatment Assessment	91
Results	95
V SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH	114
Summary	114
Discussion	115
Limitations	124
Conclusions	126
Recommendations for Further Research	127
APPENDICES	
A INFORMED CONSENT FORM	130
B TOLERANCE SCALE FOR ENURESIS AND NUISANCE SCALE FOR ENURESIS	132
C WHAT I THINK AND FEEL	133
D THIS WEEK	134
E TREATMENT RECORDING CHART	135
F THE NIGHTTIME TRAINING APPROACH	136
G RELAPSE DATA FOR SUBJECTS IN THE CONDITIONING AND PHARMACOTHERAPY GROUPS	139
H COMPARISON OF PRE- AND POST-TREATMENT SCORES ACCORDING TO TREATMENT METHOD	140

APPENDICES	<u>Page</u>
I COMPARISON OF PRE- AND POST-TREATMENT SCORES ACCORDING TO ATTAINMENT OF CURE CRITERION .	141
J COMPARISON OF PRE- AND POST-TREATMENT SCORES ACCORDING TO WETTING FREQUENCY AT WEEK #14	142
K SIGNIFICANT WITHIN-SUBJECT SPEARMAN RANK ORDER CORRELATIONS BETWEEN WEEKLY WETTING FREQUENCY AND RESPONSES TO THIS WEEK . . .	143
REFERENCES	144
BIOGRAPHICAL SKETCH	155

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By

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The purpose of this study was to investigate the difference in efficacy of the two most commonly used treatment approaches for primary nocturnal enuresis, pharmacotherapy and behavioral conditioning. The study also examined the relationship of primary nocturnal enuresis and its methods of treatment with subjects' level of emotional and behavioral adjustment. An attempt was made to identify pre-treatment predictors of treatment outcome and premature withdrawal from treatment.

Specifically, the project was designed 1) to assess change in the frequency of nighttime wetting produced by either conditioning treatment with a urine alarm or pharmacotherapy with imipramine hydrochloride ('Tofranil');

2) to determine whether change in the frequency of nighttime wetting influenced subjects' level of emotional and behavioral adjustment; 3) to determine if the method of treatment received affected a subject's level of emotional and behavioral adjustment; 4) to determine if pre-treatment variables existed which could predict outcome from treatment; and, 5) to determine whether pre-treatment variables existed which could predict premature withdrawal from the treatment program.

Subjects involved in the study were male and female children and adolescents, ages 6 through 16. A total of 49 subjects were formally enrolled in the project. From this initial study sample, 36 subjects actually completed all facets of the 15-week program.

Analyses of subjects' wetting frequency over the course of treatment revealed a significantly more effective outcome for the conditioning approach as compared with either pharmacotherapy or assignment to a clinical waiting list. Comparisons of pre- and post-treatment measures of adjustment provided insufficient evidence to support the hypotheses that either change in the frequency of nighttime wetting or the method of treatment received would significantly influence subjects' level of emotional and behavioral adjustment. In addition, only one of 26 pre-treatment variables was found to significantly predict treatment outcome. The only pre-treatment predictor of premature withdrawal from

treatment was the Tolerance Scale for Enuresis which was found to be a highly significant predictor of early termination from conditioning treatment.

CHAPTER I INTRODUCTION

The study and treatment of enuresis has an extensive and picturesque history (Glicklich, 1951). Research in the area has proceeded in many directions with attention devoted to physiological, psychological, behavioral, and social factors as they relate to etiology and treatment. The basic focus of enuresis is behavioral, the micturition response. The ultimate goal of treatment is the elimination of the inappropriate enuretic behavior.

Not all forms of urinary incontinence are included under the label of enuresis. Uncontrolled wetting that is a result of uropathology is not diagnosed as enuresis. Likewise, various age minimums (e.g., three to five years old) are used as a starting point at which lack of bladder control is viewed as dysfunctional. Various minimum criteria regarding wetting frequency (e.g., at least three wet days/night per week) have also been proposed to differentiate enuresis from occasional "accidents." Although frequently considered synonymous with bedwetting, enuresis is not limited to nighttime wetting (nocturnal enuresis) but may occur during the daytime as well (diurnal enuresis).

Although it may occur in adulthood (Thorne, 1944), enuresis is most commonly found in children, affecting approximately 15% of all five-year-olds at any one point in time (Young, 1969). This high incidence has stimulated a voluminous amount of research involving both the medical and psychological professions. It is unfortunate that much confusion and misunderstanding continue to surround the disorder. Still, a wealth of information is available from which workable hypotheses can be developed that will hopefully lead to better evaluation and treatment.

One must guard against what Kolvin and Taunch (1973) consider the simplistic approach of conceptualizing enuresis as a distinct and unidimensional phenomenon. It is inviting to identify a particular variable (e.g., urinary tract infection or psychosexual dysfunction) and then develop a theory around it. But enuresis does not appear to lend itself to such interpretation (Davidson & Douglass, 1950). The initial cause of the disorder may vary from individual to individual and may be multifactorial in nature. Should the problem continue to exist over a long period of time, it may be maintained by factors unlike the initial cause (MacKeith, 1973).

Johnson (1980) concurs with MacKeith (1973) and opts for a multidimensional perspective. It is necessary to consider physiological problems such as small bladder capacity (Zaleski, Gerrard, & Schokier, 1973). It is

important to assess the existence of a sleep disorder (Broughton, 1968; Ritvo, Ornitz, Gottlieb, Poussaint, Maron, Ditman, & Blinn, 1969). But it is essential that such factors be considered in relation to the child's intellectual and psychological functioning, the family environment, and the child's social relationship with peers. As Johnson (1980, p. 98) states, "most of us would agree that human behavior is multidetermined; enuretic behavior seems to be no exception."

In addition to studying the variables that contribute to the existence of enuretic behavior, it is possible to assess the extent to which enuresis influences other aspects of a child's life. Of particular interest might be the effect enuresis has on the child's relationship with parents. As Baker (1969) has indicated, enuresis is an appropriate behavior to use in such research as it provides concrete evidence to indicate whether or not the disorder actually exists. With the use of treatment modalities of proven effectiveness, it is possible to isolate the enuresis and evaluate secondary changes that might occur upon complete elimination of the problem behavior. In this manner, enuresis can be studied within the context of the total life experience of the child.

Rationale for the Study

Theories of enuresis can be categorized under three general headings: medical or organic, psychodynamic, and behavioral or learning interpretations. Given the goal of a more holistic approach, the present study utilized all three of these viewpoints. Research questions which relate to treatment efficacy focused on the medical and learning theory explanations, while the aspect of secondary effects dealt primarily with the learning theory and psychodynamic formulations.

Numerous attempts have been made to study the effectiveness of the urine alarm conditioning approach in eliminating enuretic behavior (see reviews by Young, 1969; Morgan, 1978). Likewise, pharmacological treatment with imipramine hydrochloride ('Tofranil') has been evaluated (MacLean, 1960; Treffert, 1964; Poussaint, & Ditman, 1965; Werry, Aman, Dowrick, & Lampen, 1977). However, there has been a major void in this research. Although the conditioning approach and imipramine pharmacotherapy have frequently been evaluated in isolation, there has been limited direct comparison of the two methods (Kolvin, Taunch, Currah, Garside, Nolan, & Shaw, 1972). This situation is particularly surprising when one considers that no other drug appears to be as effective in controlling enuresis as imipramine (Steward, 1975), and that the urine alarm is a very successful means of

intervention for wetting disorders (Johnson, 1980; Perlmutter, 1978).

The topic of secondary effects has typically been addressed from a somewhat negative perspective. Attempts have been made to show that symptomatic treatment of enuresis does not result in symptom substitution, the manifestation of alternate forms of inappropriate affect or behavior following elimination of the enuretic response. Such research attempts were justifiable since most clinicians in the field were reluctant to utilize the symptomatic approach which they considered to be an incomplete method of treatment (Werry, 1966). Although the results of these investigations (Baker, 1969; Dische, 1971; Sacks, DeLeon, & Blackman, 1974) provided no empirical support for the psychodynamic hypothesis of symptom substitution, there was only limited mention of positive secondary effects that might result from successful treatment of the disorder.

In order to assess secondary benefits, one must first consider consequences that might be the direct result of the enuresis. Although disagreement exists in regard to the true dependent variable in the relationship, numerous studies (Cust, 1952; Oppel, Harper, & Rider, 1968a; Stein & Susser, 1965) have indicated that children who exhibit enuretic behavior tend to be rated as more withdrawn, submissive, or immature than their nonenuretic peers. It

is somewhat easier to identify the secondary factors or consequences in other areas. For example, children who wet the bed experience certain restrictions such as no overnight visits with friends or no vacations at camp, and the parents of bedwetters are faced with the inconvenience of each morning's new supply of wet bed linens. Likewise, children who exhibit diurnal enuresis must carry a change of dry clothes in case an accident occurs when they are away from home.

One might expect that consequences such as these affect a child's image of self and parents. Similarly, parents' perceptions and expectations of their child plus their own feelings of adequacy as a mother or father may be directly influenced by their child's enuresis. The present study investigated the extent to which such secondary factors are related to the enuretic behavior.

Purpose of the Study

This study compared the effectiveness of two methods commonly used in the treatment of childhood enuresis, conditioning treatment with a urine alarm and pharmacotherapy with imipramine hydrochloride ('Tofanil'). The study also investigated secondary effects that could be attributed to the elimination of the enuretic behavior.

The study addressed the following questions:

- 1) What is the comparative effectiveness of conditioning treatment using a urine alarm vs. pharmacotherapy with imipramine hydrochloride in the treatment of primary nocturnal enuresis in children?
- 2) What effect does treatment outcome have on a child's emotional and behavioral adjustment?
- 3) What effect does treatment method have on a child's emotional and behavioral adjustment?
- 4) Does a pre-treatment variable exist which can predict the outcome of treatment?
- 5) Does a pre-treatment variable exist which can predict premature withdrawal from treatment?

Definitions of Terms

Considerable debate exists regarding the appropriate criteria to be used for enuresis. Age, frequency, and duration requirements vary considerably from study to study (see Douglas, 1973; Forsythe, Merrett, & Redmond, 1972). Since enuresis does not appear to be a unified phenomenon, researchers have developed various classifications

of the disorder. The individual categories are listed below as part of the definition of the more general term of enuresis. Since the present study focused on bed-wetting only, the operational meanings for enuresis and nocturnal enuresis become synonymous.

The following definitions were used in this study:

Enuresis -- urinary incontinence occurring at least three days/nights per week in a person over the age of four for whom there is no evidence of neurological or genitourinary abnormality.

Nocturnal Enuresis -- enuresis that is limited to nighttime only.

Diurnal Enuresis -- enuresis that is limited to daytime only.

Nocturnal/Diurnal Enuresis -- enuresis that occurs both at night and during the day.

Primary Enuresis -- enuresis that has continued at criterion level since birth without periods of dryness of one year or more.

Secondary Enuresis -- enuresis that is a resumption of wetting at criterion level after a dry period of at least one year following the pre-trained incontinent stage.

Cure Criterion -- the period of time (14 consecutive nights in the present study) that a child must be continent in order to be considered non-enuretic.

Relapse Criterion -- the frequency of wetting following the attainment of cure criterion that will signal the reoccurrence of enuresis (at least three nights during a period of 14 consecutive nights in the present study).

Tricyclic Antidepressants -- a group of synthetic drugs structurally related to the phenothiazine tranquilizers that are used in the treatment of childhood enuresis and all types of depression.

Self-Concept-- the conscious image a person has about self which includes awareness of one's attitudes and values, mental and physical abilities, and social relationships.

CHAPTER II REVIEW OF RELATED LITERATURE

The review of literature for this study is divided into the following sections: a) overview, b) theoretical formulations, c) treatment approaches, d) self-concept, and e) emotional and behavioral correlates. Since there is an extensive body of literature available on enuresis (DeJonge, 1973; Perlmutter, 1978; Starfield, 1972; Yates, 1970), discussion is limited to those areas directly applicable to the focus of the proposed investigation.

Overview

A comparison of the results from different studies is often difficult because researchers have utilized different client populations and have been inconsistent in their use of operational definitions for enuresis (DeJonge, 1973). The conclusions presented below provide a general description of the disorder, although all points may not apply to each and every case.

The most consistent finding among the research has been the decline in the prevalence of enuresis with increasing

age. The annual rate of spontaneous remission between the ages of 5 and 19 is 14-16% (Forsythe & Redmond, 1974) which partially accounts for the decrease in the overall incidence rate from 15% at age 5, to 5% at age 10, and to 1% at age 15 (Young, 1969). Age then becomes an important variable to consider when one evaluates treatment research since symptom remission could be attributable to age as well as the effect of an intervention program.

Enuresis is more commonly found with males than females, and as a general rule, nocturnal enuresis is more prevalent than diurnal enuresis. However, there appears to be an interaction between sex and enuresis type since nocturnal enuresis is more likely to occur with males and diurnal enuresis with females (DeJonge, 1973). Although Blomfield and Douglas (1956) reported a higher incidence of enuresis with the children of manual workers, Oppel et al. (1968a) found no such relationship between enuresis and socioeconomic level. This conflicting evidence prompted Rutter, Yule, and Graham (1973) to hypothesize that variations associated with a social class gradient may be due to a secondary factor, such as the rate of stressful events during childhood, rather than socioeconomic level in and of itself.

It is important to distinguish between primary and secondary enuresis. The latter, sometimes referred to as onset enuresis, occurs less frequently and is found in about one-third of those children identified as nocturnally

enuretic (Starfield, 1972). Kolvin and Taunch (1973) have suggested an etiological difference between primary and secondary enuresis. However, Rutter et al. (1973) and MacKeith (1973) concluded that there is a lack of empirical evidence to justify such a position.

Theoretical Formulations

Tremendous effort has been devoted to the search for causes of enuresis and many theories have been proposed to explain the disorder. The position to which one adheres depends to some extent on the field or perspective from which the problem is addressed. Since micturition is a physiological response, it is not surprising to find a wealth of medical interpretations concerning the problem. Likewise, the traditional formulation of enuresis as a symptom of underlying psychopathology has stimulated the development of hypotheses with more psychologically oriented viewpoints. The following incorporates findings from the genetic, organic, psychodynamic, and behavioral positions as they apply to the proposed investigation.

Genetic Interpretation

A familial factor does appear to operate with enuresis. Bakwin (1973) indicates that the rate of occurrence within a

family is directly related to the closeness of the genetic relationship. Researchers have found a higher incidence of enuresis with siblings of bedwetters (Blomfield & Douglas, 1956) and with children of parents who at one time had this problem (Hallgren, 1957). Additional evidence indicating that monozygotic twins are twice as likely as dizygotic to be concordant for enuresis prompted Bakwin (1973) to propose a genetic basis for bedwetting.

One must be cautious in this regard as these results may also be attributable to common factors, such as child-rearing practices, that operate within the family system (Brazelton, 1962). It is possible that a genetic factor exists, but it may only predispose for the disorder by affecting the age at which a child develops the necessary physical maturation for bladder control (MacKeith, 1973). Therefore, a more appropriate formulation might be that genetic influences are only one of the factors that may contribute to the existence of enuretic behavior in a given child.

Organic Formulations

Urinary incontinence can be caused by organic abnormalities or illness. Scott (1973) describes various physical problems associated with lack of bladder control (e.g., chronic renal failure and urinary tract obstruction).

Urinary tract infection is also commonly found with enuretic children, especially girls, but the infection may be a result, rather than a cause of the enuresis (Stansfield, 1973). Although a very small percentage of bedwetting cases can be attributed to uropathology (Forsythe & Redmond, 1974; Kendall & Karafin, 1973), it is important for the clinician to rule out the possibility of organic abnormality by first consulting with appropriate medical personnel.

Cases of urinary incontinence that are a result of organic pathology are not considered examples of enuresis. The dynamics surrounding these cases are different from those found with the normal bedwetting pattern. However, certain organic factors are related to what is typically defined as enuresis. This review is limited to a discussion of small bladder capacity, depth of sleep, and maturational lag.

Children who exhibit enuretic behavior appear to have smaller bladder capacities than their non-enuretic counterparts (Doleys, Ciminero, Tollison, Williams & Wells, 1977; Starfield, 1967; Zaleski et al., 1973). This finding has intuitive appeal since a small bladder capacity might prevent the retention of the amount of urine necessary to last through a normal night's sleep. Zaleski et al. (1973) found no structural difference in bladder capacity between a group of enuretic children and non-enuretic controls.

However, they did find a functional difference. Although both groups of children passed equal amounts of urine during a 24-hour period, the children with enuresis urinated more frequently and passed smaller volumes at each voiding than did their non-enuretic peers. Their results suggest that small bladder capacity may be a result of poor habit formation rather than a sign of uropathology.

A commonly held opinion of enuresis is that the problem is a form of sleep disorder in which a child experiences poor arousal to internal and external stimuli (Kolvin & Taunch, 1973). Children who wet the bed are frequently described by their parents as deep sleepers who are difficult to awaken (Braithwaite, 1955). More recent investigations have indicated that enuretic episodes may occur during both light and deep stages of sleep (Broughton, 1968; Ritvo et al., 1969).

Contrary to popular opinion, bedwetting incidents rarely occur while a child is dreaming (Broughton, 1968; Ritvo et al., 1969). Broughton (1968) reported that rapid-eye-movement (REM) sleep, the pattern associated with dreaming, always followed the enuretic episode, typically after 5-15 minutes of further non-REM sleep. This result may account for the dreaming that children sometimes report to be associated with bedwetting incidents. Rather than occurring concomitantly with the enuretic episodes, the dreams are more likely the result of later exteroceptive stimulation from the wet bed.

The third organic position to be considered is that of maturational lag, a concept frequently associated with developmental delay (see reviews by Perlmutter, 1978; MacKeith, 1972). As indicated by MacKeith, Meadow, and Turner (1973), maturation is the term applied to the pre-determined and orderly growth of structures and functions inherent in the central nervous system (CNS). Maturational lag then indicates a slow rate of growth relative to the normative standards for a particular age group. On the other hand, development relates to the behaviors that emerge as the result of CNS maturation (MacKeith et al., 1973). Since behavior is overt and CNS growth is relatively difficult to observe, developmental improvement is frequently used as an indirect measure of maturation.

Maturational lag has been adopted by some as an explanation for the wide variation in the age at which bladder control develops (MacKeith, 1973; Perlmutter, 1978). A child must possess certain neuromuscular mechanisms before urinary control can develop, but it is assumed that youngsters gain control of these mechanisms at different ages. CNS maturation is genetically determined. It cannot be hastened by training but its emergence can be delayed by environmental assaults such as illness, injury, or anxiety. The task facing researchers who study enuresis is the determination of the point at which adequate maturation exists for normal bladder control. Brazelton (1962) indicated that

98 1/2 percent of his sample of 1170 children were dry at night by age five. Although maturational lag may be a possible cause of urinary incontinence in younger children, MacKeith et al. (1973) concluded that it is probably responsible for only a very small percentage of the enuresis cases in individuals over five years of age.

Psychodynamic Interpretations

The various formulations described as intrapsychic, psychodynamic, or psychoanalytic all have one common feature: enuresis is viewed as an overt symptom of an underlying emotional disturbance. Symptomatic treatment is frowned upon since it avoids the true problem, the underlying emotional problem, and because it can result in symptom substitution, the re-emergence of the basic disturbance in an alternate form. Although empirical research is limited, the psychodynamic position has had a profound effect on the theoretical interpretation of enuresis (Young, 1969).

There is little agreement regarding the basic nature of the disorder and the specific factors that cause enuresis. Psychoanalytic theorists have interpreted enuresis as a form of sexual discharge or as a masturbation equivalent (Fenichel, 1945); it has also been considered a form of conversion hysteria (Deutsch, 1953). Conflicts arising within the mother-child relationship have been cited as contributory factors to the existence of urinary incontinence (Sperling,

1965). Sweet (1946) hypothesized that enuresis is a regressive urge in which the child subconsciously wishes to remain in or return to the protected, irresponsible state of infancy. In contrast, urinary incontinence may also represent a subconscious resentment against the parents and provide a means of retaliation (Sweet, 1946).

The emotional problems that may cause and maintain enuresis are personal in nature and are therefore different from individual to individual. This accounts for the large number of causal factors attributed to the disorder. No clear explanation is provided for the reason enuresis becomes the overt symptom of the underlying problem, but it is assumed that physiological predisposition somehow interacts with the psychological disturbance and enuretic behavior results.

Behavioral Formulations

According to the behavioral position, enuresis is a result of deficient learning. This interpretation directs attention to the enuretic response, with minimal concern devoted to underlying emotional problems. The major emphases are training the child to associate the sensation of distended bladder with the need to micturate and to have the youngster develop discriminative ability in regard to appropriate sites for micturition.

Behavioral formulations have been confronted with alternative explanations that minimize the role of training in the development of urinary control. Muellner (1960) opted for a maturational hypothesis when he stated that bladder control is a self-learned skill involving a complex interaction of muscular functions. He contends that it is not possible for parents to train their children in the mastery of the voluntary mechanisms involved with normal micturition (Muellner, 1960). Bladder control appears spontaneously with no need for external intervention. Others have echoed this position by stating that nocturnal urinary control is a result of maturation and not learning (Klackenberg, 1955; MacKeith et al., 1973).

Yates (1970) agrees that maturation is an important factor, but he contends that it is only one of three major variables associated with the normal development of bladder control. Before a child can attain voluntary control of micturition, it is necessary for adequate physiological growth to have occurred, particularly in terms of the muscular structure in the bladder. In addition to this maturational factor, Yates (1970) identifies two other requirements which are more an outgrowth of learning. One such skill is that of high-level cortical control. The child must have acquired a level of neurological maturation that allows for inhibition of involuntary urination and also permits development of voluntary control of the complex

response pattern involved in normal micturition. The youngster must also develop the ability to discriminate environmental cues that determine whether voiding is done in a socially appropriate manner. This learned awareness encourages the child to urinate in an acceptable site when the bladder may be much less than full, rather than waiting to void in an improper place once urgency develops. An example of this would be the youngster who has a partially filled bladder but who micturates at a public restroom prior to going on a two-hour sailboat ride.

Both classical and operant conditioning interpretations have been proposed to explain the development of urinary continence. At the present time it is difficult to choose the more appropriate formulation due to a lack of sufficient information (Turner, Young, & Rachman, 1970). Nevertheless, one can summarize the behavioral approach as one that is concerned with discriminative cues, both internal and external, and with the antecedent and consequent events associated with the micturition response.

Treatment Approaches

Treatment approaches for enuresis are as numerous and varied as the etiological formulations designed to account for the disorder. Limited attempts have been made to develop

programs involving diet restriction, hypno-therapy, punishment, and bladder training methods, but the most popular procedures have been counseling, behavioral conditioning, and pharmacological treatment. The present review is limited to a discussion of the most popular approaches. Empirical evidence is available on these methods, especially the pharmacological and behavioral programs.

Counseling or Psychotherapy

The basic rationale for the psychotherapeutic approaches is the psychodynamic formulation. According to this viewpoint, proper treatment of enuresis must go beyond the enuretic behavior to the underlying emotional disturbance which is thought to be the cause of the problem. Although this approach has considerable appeal, there is limited empirical support for its claims of therapeutic effectiveness.

Werry and Cohrssen (1965) were unable to find a significant difference between no treatment and supportive psychotherapy. DeLeon and Mandell (1966) were able to cure only 18.2% of their clients with a form of psychotherapy as compared with a success rate of 11.1% for a waiting-list control group. Similar results were obtained by Sacks et al. (1974) who achieved success rates of only 20% for psychotherapy and 22.2% for a no-treatment control group. An uncontrolled factor in all of these studies was the type

of psychotherapy provided. Both DeLeon and Mandell (1966) and Sacks et al. (1974) used 12 weekly sessions which consisted of 40 minutes with the child and 20 minutes with the mother. However, the actual format for therapy was unspecified but was left to the discretion of the individual therapist.

Steward (1975) identified advice and encouragement as a common method of treatment. This technique, discussed here since it bears some resemblance to other counseling approaches, typically elicits the child's participation by having the youngster keep a record of wet and dry nights on a calendar. The therapist then provides encouragement for the child and attempts to alter the emotional climate in the family. Dische (1971) found that 37% of her sample attained bladder control with the use of this method alone.

Control of treatment format is also a problem with advice and encouragement. One can identify two major treatment variables: record keeping by the child and encouragement from the therapist. An important question to consider is the extent to which each of these factors contributes to successful outcome. Dische (1971) felt that charting alone had a therapeutic function. One would also expect therapist involvement to be an important variable, but Baker (1969) cast some doubt on this assumption.

Since most intervention programs involve clinician/client interaction, it is difficult to abruptly dismiss the

role that psychotherapeutic techniques play in treatment. Such methods inadvertently become part of most intervention packages as advice, social reinforcement, and reflection of client or parent feelings may be utilized in the treatment setting. Given the disruption that appears to exist within enuretic families (Nilsson, Almgren, Kohler, & Kohler, 1973; Oppel et al., 1968a; Umphress, Murphy, Nickols, & Hammar, 1970; Wolkind, 1976), psychotherapeutic techniques might serve to uncover feelings and behaviors of parents or siblings that help to maintain the enuretic behavior. In this sense, psychotherapy may be considered a valuable adjuvant to other modes of treatment as was recommended by Shader (1968) and Starfield (1972).

Pharmacotherapy

The use of medicinal remedies for the treatment of enuresis has been dated as far back as 1500 B.C. (Glicklich, 1951). The herbal concoctions of ancient times have given way to the synthetic drug compounds of modern medicine. Although research has been conducted with a variety of drugs such as stimulants, sedatives, and antidiuretics, the most effective pharmacological agent has been the family of tricyclic antidepressants (Meadow, 1973).

The most commonly prescribed antidepressant has been imipramine hydrochloride, 'Tofranil' (manufactured by Geigy). MacLean (1960) was the first to investigate the use of this

drug in the treatment of childhood enuresis. Since that time numerous studies have been conducted but researchers are still unable to describe the mechanism by which imipramine reduces the frequency of enuretic behavior. Some believe the drug has a relaxing effect on bladder muscles (Poussaint & Ditman, 1965); others cite a differential effect on the stages of sleep (see Perlmutter, 1978; Steward, 1975).

The typical criterion for dosage level has been age, although body weight has also been used (Werry et al., 1977). Children under the age of 8 are administered 25 mg. of medication, while older children receive 50 mg. At one point in time imipramine was not approved for use with children under the age of 12 (Starfield, 1972), but recent changes now allow prescription of the drug to children as young as 6 years old (Medical Economics Company, 1981).

Cure rates with imipramine vary depending upon client population, sex, age, and treatment duration. Perlmutter (1978) cites an overall average of 40-50% of the children cured, with an additional 10-20% greatly improved. These figures appear to be somewhat high given the evidence presented by Johnson (1980) in her review of imipramine treatment literature which indicated cure rates ranging from 9% to 47%, with only two studies reporting rates above 25%.

Children treated with imipramine are highly susceptible to relapse once the medication is withdrawn. MacLean (1960),

Margolis (1962), Mariuz and Walters (1963), Treffert (1964), and Thomsen, Reid, and Hebeler (1967), all report relapse as an invariable result of drug termination. There is evidence to suggest that the manner in which the drug is withdrawn somehow determines whether relapse will occur. Poussaint and Ditman (1965) reported no reoccurrence of symptoms with children who received gradual withdrawal from imipramine, but the results were not replicated by McConaghy (1969).

Side effects from imipramine occur infrequently but they need to be taken into consideration when a child is placed on the drug. The most frequent adverse effects have been sleep disorders, nervousness, tiredness, and mild gastrointestinal disturbances (Medical Economics Company, 1981). Since poisonings and death have been reported, it is necessary for parents to supervise drug administration with younger children and to guarantee proper storage of the medication in a location that is inaccessible to younger siblings. Mofenson, Greensher, and Horowitz (1972) report possible severe symptoms with an overdose of 10 mg. per kg. of body weight, definite occurrence of such symptoms at 20 mg., and possible death at 40 mg.

A nonorganic side effect of imipramine may be long-term use of the drug by some parents as a means of controlling their child's behavior (Werry, Dowrick, Lampen, & Vamos, 1975). Mothers of subjects who were administered imipramine

reported considerable improvement in their child's behavior, almost to a super-normal level. Werry et al. (1975) raised the ethical question of whether children were being continued on imipramine as a means of behavior management rather than for treatment of their enuresis. The authors recommended that use of antidepressants be limited to brief periods of two or three months with ongoing evaluation of psychotropic effects and the manner in which these effects alter the emotional climate of the family system.

Given the high rate of relapse with imipramine, the treatment may be viewed as a "simple method of temporarily suppressing a troublesome type of behavior" (Kolvin et al., 1972, p. 721). Miller, Champelli, and Dinello (1968) supported this notion with their hypothesis that imipramine is successful in curing enuresis in certain children simply because the drug controls wetting until spontaneous remission of symptoms occurs with normal maturation. The pharmacological approach may be carried out with relative ease, especially when compared with behavioral techniques, but low initial cure rates, high relapse rates, and possible side effects detract from the drug's appeal and invite consideration of other forms of treatment (Perlmutter, 1978).

Behavioral Treatment

Numerous behavioral techniques have been used with youngsters who exhibit urinary incontinence. Two common features of these methods have been the identification and description of the problem behavior relative to antecedent and consequent events plus quantification of that behavior coupled with recording of response frequency over time. The problem behavior in enuresis is the enuretic response which is usually measured in terms of the frequency of wet nights, although number of bedwetting incidents is also used. Treatment effectiveness is then determined by monitoring the rate of enuretic episodes over the course of the intervention program.

When considered on a more specific level, each behavioral treatment package exhibits a uniqueness that differentiates it from other approaches. Ross (1974) developed a successful contingency management program in which material and social rewards were used to positively reinforce "dry" nights. A contingency management approach was also utilized by Nordquist (1971) but the enuresis was ignored and attention was directed at a secondary response class, oppositional behavior. The results from this single-subject reversal design indicated that enuresis was eliminated when parents positively reinforced cooperative behavior and applied a time-out procedure to suppress the oppositional behavior. Tough, Hawkins, McArthur, and Ravenswaay (1971)

made punishment contingent upon the enuretic response. The results from their multiple-baseline-across-two-subjects design indicated that only one child was cured of his enuresis when the mother followed wetting with immersion in a bathtub of cold water. Although the problem behavior was eliminated in the one case, the use of such a procedure is highly questionable given the emotional correlates sometimes reported with enuresis.

Kimmel and Kimmel (1970) developed a diurnal instrumental conditioning procedure, later referred to as Retention Control Training (Miller, 1973). This approach attempts to train a child to sleep through the night without experiencing a need to micturate. This goal is theoretically accomplished by increasing the child's functional bladder capacity through the consumption and prolonged retention of liquids during the daytime. Although Kimmel and Kimmel (1970) reported complete remission of symptoms in their three subjects, a follow-up investigation by Paschalis, Kimmel, and Kimmel (1972) was able to cure less than half of the children treated (19/31) with an additional 25% (8/31) listed as significantly improved. Likewise, Rocklin and Tilker (1973), utilizing a bladder training program, were unable to replicate the Kimmels' original findings. Later studies have indicated that Retention Control Training does increase functional bladder capacity but this may not translate into a significant reduction in the frequency of

enuretic incidents (Doleys & Wells, 1975; Doleys et al., 1977; Harris & Purohit, 1977).

By far the most intricate program designed for the treatment of childhood enuresis is the operant conditioning procedure outlined by Azrin, Sneed, and Foxx (1973, 1974). These authors conceptualized enuresis as "a socially unacceptable response that persists because the social reinforcement and social inhibitory influences are not acting at an optimal level" (Azrin et al., 1973, p. 428). Known as Dry Bed Training, this intensive program is designed to eliminate enuresis with one day of training administered in the child's home by a trained professional.

Dry Bed Training involves the use of numerous components. Retention Control Training is incorporated into the method as is the Mowrer and Mowrer (1938) conditioning apparatus (described below). Another aspect of the program is Positive Practice, a procedure in which the child lies in bed for approximately 30 seconds, arises and walks to the bathroom, assumes the micturition stance and attempts to urinate before returning to bed. Twenty repetitions of Positive Practice are performed prior to bedtime and immediately following every enuretic incident. Nightly accidents also require that the youngster engage in Cleanliness Training during which the alarm apparatus and wet sheets are removed from the bed, linens are disposed of in an appropriate place, and the bed is then remade and the alarm reassembled.

This approach has been successfully used with institutionalized retardates and normal children, but it is unclear which components contribute significantly to treatment outcome. Available empirical evidence suggests that the alarm apparatus is important (Bollard & Woodroffe, 1977; Nettlebeck & Langeluddecke, 1979) and that professional trainers can be replaced with parents who administer the treatment program (Bollard & Woodroffe, 1977). Doleys et al. (1977) found Dry Bed Training clearly superior to a bladder training program which would suggest that Retention Control Training may not be an essential part of the treatment package. Sadler and Merkert (1976) indicated that the approach is hampered by the considerable amount of time and effort needed to administer the program. More research is necessary to identify crucial aspects and to refine the procedure.

The most popular behavioral approach, and the most effective form of intervention for bedwetting, has proven to be the enuresis alarm recommended by Mowrer and Mowrer (1938). Although cure rates vary from study to study (see review by Johnson, 1980), an average of 80% of the children treated with this approach develop bladder control (Perlmutter, 1978). Outcome studies have indicated that this approach is more effective than supportive therapy (DeLeon & Mandell, 1966; Sacks et al., 1974; Werry & Cohrssen, 1965) and evidence has suggested that treatment with a urine

alarm is more successful in reducing the frequency of enuretic incidents than pharmacotherapy with imipramine (Kolvin et al., 1972).

The urine alarm represents an application of learning theory to the treatment of bedwetting. Enuresis is interpreted as a learning deficit in which the child fails to associate the feeling of a distended bladder with the need to awaken and micturate. Mowrer and Mowrer (1938) believed that the alarm represented a classical conditioning approach in which an unconditioned stimulus (the sound of the alarm) was paired with a conditioned stimulus (the feeling of a distended bladder) resulting in a conditioned response (arousal to bladder cues alone). The problem with this explanation is that classically learned responses tend to extinguish once the unconditioned/conditioned stimulus pairing is eliminated.

This observation has lead Azrin et al. (1974) and Lovibund (1964) to conclude that the Mowrer apparatus could be more adequately explained with an avoidance conditioning model. Rather than a classical pairing of two stimuli, success with the conditioning apparatus may result from the anticipation of an aversive consequence (the sound of the alarm coupled with the cleanliness tasks required of the child). With repeated trials learning occurs as the youngsters awakens to the internal cue of a distended bladder and then arises to urinate in an appropriate site.

Various models of the alarm are commercially available (see Dische, 1973) but all operate according to the same basic principle. The apparatus consists of two layers of perforated foil or wire mesh that are separated by a thin layer of absorbent cotton sheet. Electrodes connect the two metal layers with a bedside power unit in which a battery and a bell or buzzer alarm are housed. When the cotton insulating sheet is dry, the electrical circuit is incomplete between the battery and the alarm. Once liquid is absorbed by the sheet, the circuit is closed and the alarm sounds. A power switch located on the bedside unit can then be used to terminate the sound of the alarm.

Dische (1973) provides an excellent review of the procedure one should follow when treating an enuretic child with the urine alarm. Conditioning treatment typically involves an ongoing assessment of the enuretic behavior, training parents and the child in the use of the alarm, plus proper and consistent application of treatment procedures by the family.

At the outset of treatment the therapist evaluates the severity of the child's enuresis by having the parents keep a pretreatment record of their youngster's bedwetting pattern (Dische, 1971). A calendar can be used for this purpose with "wet" and "dry" nights registered accordingly. This form of assessment continues after the intervention program is initiated since it serves as an indicator of

treatment effectiveness. A functional analysis of the problem behavior is also made to identify possible antecedent and consequent events that influence the enuretic response. A pretreatment assessment of functional bladder capacity can be done by asking the parents to have their child refrain from voiding as long as possible, directing the youngster to urinate in a graduated container, and then recording the volume of liquid that is passed (Starfield, 1972). Parents must also have their child examined by appropriate medical personnel to eliminate the possibility of organic pathology.

Once sufficient baseline data have been collected in regard to the enuretic behavior, the therapist can train the parents and the child in the proper use of the apparatus. This can be done in the clinician's office or in the home of the client. In addition to the demonstration, the therapist needs to provide the parents and the child with a written explanation of the alarm apparatus and a detailed description of the treatment procedure to be followed. It is also important for the therapist to collect information regarding the number of children (or parents and children) sleeping in one room or in one bed, the distance from the child's bed to the bathroom, the level of illumination available in the bedroom at night, etc.

The ideal intervention program is one in which the child assumes responsibility for treatment, although it is

always necessary for the parents to insure that all aspects of the training program are performed successfully. Prior to retiring each evening the child inspects the apparatus, makes certain that it is properly assembled, and then activates the alarm by turning on the power switch. If an accident occurs during the evening and the alarm sounds, the child must first arise and then turn off the buzzer before going to the bathroom and emptying the bladder. At this point Cleanliness Training (Azrin et al., 1973, 1974) is performed. After splashing the face with water to guarantee alertness, the child returns to the bedroom, removes any wet bed linens, and places them in a paper bag located nearby. The child then removes the insulating sheet from the apparatus and installs a dry replacement. Dry linens are placed on the bed, the apparatus is reactivated, and the child returns to sleep.

Consistent use of the treatment procedure is a must. Collins (1973) found a definite relationship between the rate of cure and consistent use of the intervention program. For those youngsters who made appropriate use of the alarm apparatus, the cure rate was 84%, but that figure dropped to 33% for the children who used the apparatus in an inconsistent manner. The conditioning approach requires more time and effort from parents than is needed with certain other methods (e.g., pharmacotherapy). Lack of parent cooperation frequently results in early termination and treatment failure (Forsythe & Redmond, 1970; Geppert, 1953;

Turner et al. 1970; Young, 1965). Although empirical evidence is lacking to support the hypothesis, it would appear that therapist attention needs to be directed toward parental concerns and attitudes, particularly toward their child's enuresis (Morgan & Young, 1975), as well as the behaviors and feelings of the enuretic child.

Various components of the conditioning approach have been examined in regard to their impact on treatment outcome. Collins (1973) indicated the importance of temporal contiguity between the enuretic response and the consequent sound of the alarm apparatus. A five minute delay in the activation of the alarm resulted in significantly fewer youngsters attaining cure criterion than was the case with the contiguous alarm approach. Finley and Wansley (1977) investigated two levels of auditory intensity and found a superior treatment effect with the louder alarm (105dB vs. 80dB). The rate of the reinforcement schedule has also been studied by comparing continuous application of the buzzer consequence with intermittent reinforcement. No significant difference has been found between the continuous approach and intermittent schedules of 50% (Taylor & Turner, 1975; Turner et al., 1970) and 79% (Finley, Besserman, Bennett, Clapp & Finley, 1973).

Although the urine alarm is quite successful in producing initial remission of symptoms, later reoccurrence of the wetting behavior remains a problem. Johnson (1980) cited

relapse rates that range for 13% to 56%. Morgan (1978) indicated that an average of 35% of the children originally cured of enuresis resume wetting within one year following the termination of treatment. Although many of the children who relapse become permanently dry after retreatment with the urine alarm (Forsythe & Redmond, 1970; Geppert, 1953), attempts have been made to develop intervention strategies that initially result in permanent cure.

Intermittent reinforcement schedules were originally developed as a means of reducing high relapse rates. Of the numerous studies conducted, only Finley et al. (1973) found a rate significantly lower than that obtained with a continuous schedule. Another technique designed to reduce relapse is a procedure known as overlearning. This method is incorporated into the traditional conditioning treatment after the child has attained cure criterion. The youngster abruptly increases pre-bedtime fluid intake, usually by 1 - 1 1/2 pints, and continues to use the alarm apparatus until cure criterion is once again achieved. Young and Morgan (1972) compared overlearning with the traditional conditioning approach and found that overlearning resulted in a significantly lower rate of relapse. Although their results were not significant, Taylor and Turner (1975) obtained a lower rate of relapse with overlearning than they did with a continuous or intermittent reinforcement procedure. Young and Morgan (1972) recommended

that overlearning be included as a routine element in the conditioning treatment of enuresis. However, some adjustments need to be considered. Young and Morgan (1972) reported that certain children relapsed badly when overlearning was initiated. This problem may be due to the abrupt increase in fluid intake, a point that has stimulated Johnson (1980) to recommend a more gradual approach.

Brief attention must be directed to side effects associated with the conditioning apparatus. "Buzzer ulcers" occur when a child wets the bed, does not awaken, and remains in contact with the electrical current passing through the apparatus. Dische (1973) indicated that such ulcers are a potentially serious problem but are fortunately uncommon. Parents can guard against the possibility of buzzer ulcers by insuring that the apparatus is functioning properly and that their child is aroused by the sound of the alarm. Although psychodynamic theorists predict problems with symptom substitution, empirical data are lacking to support such a claim (Baker, 1969; Sacks et al., 1974). Given the existing evidence, one can conclude that treatment with a urine alarm is a safe and relatively successful method of eliminating enuretic behavior.

Self-Concept

Investigations into the meaning of self have been wrought with definitional shortcomings and inconsistencies. Although the label, "self-concept," has been a popular descriptor for one's awareness and opinion of self, there have been numerous terms used for this purpose. Wells and Marwell (1976) listed a number of these phrases, such as self-confidence, self-esteem, self-respect, ego, self-acceptance, and self-satisfaction. An important task facing contemporary researchers is the selection and definition of the term(s) considered most appropriate for the topic under discussion.

Regardless of the label selected, it is necessary to consider the psychic nature of the phenomenon under investigation. Theorists have frequently viewed their focus of study in a way that has lead to its reification which treats it as a physical object. This outlook becomes an obstacle if one's goal is that of conducting empirical research of the self. According to Gergen (1971) it is more productive to consider self as a hypothetical construct which may be helpful in predicting behavior although it has no externally observable referent. In this way, self is like a "fiction" which is treated "as if it refers to a fact" (Gergen, 1971, p. 14).

An important point of deliberation is the origin and maintenance of the self-concept. Gergen (1971) stated that one's concept of self is formed through the sensation of external data which are then organized through a process of cognition. Taken together, sensation and cognition are insufficient to explain the development of self. What is needed is a third factor of reinforcement dependence which accounts for the effects of an individual's interaction with the social environment (Gergen, 1971). In other words, one's self-concept is influenced by each behavior exhibited and every situation experienced, but there is an important function played by social reinforcement which serves to develop a concept of self that reflects "the way a person wishes to be seen and known by others" (Jourard, 1974, p. 151).

It is necessary to consider whether self should be viewed as a single, unified entity or as a multi-dimensional phenomenon. Wells and Marwell (1976) suggested that common usage of the term favors a unitary interpretation but they indicated that variations do exist in the way an individual approaches and responds to different situations. Gergen (1971) focused on this situational perspective and opted for a multidimensional approach which he felt would be more productive in terms of research outcomes. Although the present study defines self-concept as that relatively stable image of "I," or "me," it is recognized that an individual

can assume different identities and levels of self-esteem as environmental stimuli merit. By focusing on these two variable aspects of self-concept, the current investigation has adopted the multi-dimensional interpretation and has attempted to operationalize somewhat the abstract term of self-concept.

As stated above, identity and self-esteem are considered as two aspects of self-concept. Identity is formed through a process of self-definition. By answering the question, "Who am I?", identity provides that connection between the individual's past and future. Of greater significance to the present study is the phenomenon of self-esteem which represents an individual's personal appraisal of self. Self-esteem has been defined as "a more or less phenomenal process in which the person perceives characteristics of herself and reacts to those characteristics emotionally or behaviorally" (Wells & Marwell, 1976, p. 164). Gergen (1971, p. 11) provided a more concise and directional meaning, "the extent to which the person feels positive about himself." Self-esteem can be conceptualized as the self-evaluatory behavior which attempts to answer the question, "What am I like?"

The particular identity and level of self-esteem functioning at any point in time are affected by two factors, salience and differentiation (Gergen, 1971). Differentiation is essentially a reflection of the person's complexity of self. The greater the number of identities an individual

possesses, the greater the degree of differentiation. A person with a high level of differentiation may function as a father, husband, son, friend, golfer, teacher, and gardener. The more complex the degree of differentiation, the greater the individual's capacity to withstand the negative effects of conflict or failure.

The concept of self operating at any given moment is dependent upon the salience of the identity. Salience represents a situationally dependent factor in which certain stimulus cues are necessary for the emergence of the particular identity and related self-esteem level. The individual's "golfer" identity is likely to become salient when the person is in close proximity to the local country club. The level of self-esteem associated with this identity is influenced by the individual's past experiences on the golf course and the expectations for future performance.

Jourard (1974, p. 155) stated that, "people act in ways that confirm their self-concepts." As mentioned above, the repertoire of actions available to an individual depends upon the extent to which the self-concept possesses differentiation. The child who has adopted one identity of "failure" and has accepted its inherently low level of self-esteem will react in a more limited but consistent manner than the youngster who can draw upon a variety of identities, such as "brilliant student," "immature bedwetter," and "adequate baseball player."

In a similar manner, the salience of a particular concept of self will be affected by the level of differentiation. The enuretic youngster who possesses one identity, "immature bedwetter," will be expected to experience low self-esteem across a variety of situations. In contrast, the youngster who also possesses an identity of "brilliant student" may have a less generalized outlook toward life. The second youngster's "immature bedwetter" identity may become salient at home around bedtime and during the early morning hours, but when the child is in the successful atmosphere of the classroom, the youngster's identity and self-esteem level would change as "brilliant student" came to the fore. An empirical question worthy of investigation is the extent to which one identity and its related self-esteem level generalize across situations.

Research in the area of self is dependent upon data of a secondary nature. Although a person's identity and level of self-esteem are knowable to that individual, others must rely upon inference through the use of self-reports, behavioral observations and ratings, or projective techniques. Such information is subject to error since individuals can respond in what they feel is a socially desirable manner (Wylie, 1961). As a result, one must always reserve some level of doubt in regard to the validity of such data.

Combs and Snygg (1959) considered self as both a consequence of prior experience and a guide for the future.

The question facing those involved in the helping professions is the appropriate point of intervention for individuals who are seeking change. This is of particular significance when one is discussing the effectiveness of symptomatic treatment programs. If a client enters therapy with a problem for which successful symptomatic approaches exist, is it more appropriate to treat the target problem and anticipate generalized improvement or is it better to deal with the person's general outlook toward self and expect remission of the particular symptom?

Wylie (1961) cited research indicating change in self-evaluations following situations in which success and failure were experimentally induced. The author reported that changes in a subject's self-ratings were generally restricted to the experimental task itself rather than global evaluations of self (Wylie, 1961). These results are of significance to the present study since primary nocturnal enuresis has responded successfully to symptomatic treatment. An initial question would be the extent to which enuresis, a socially inappropriate behavior, influences a child's appraisal of self. Since primary nocturnal enuresis has responded positively to symptomatic treatment, an additional focus of investigation could be the change that might occur in a youngster's self-concept following elimination of the target behavior. Both of these questions could be studied in terms of the level of

change and the specific/global nature of that change. Through an objective assessment of emotional and behavioral factors frequently associated with enuresis, inferences could be drawn in regard to the role played by enuresis in the development of self-concept.

Emotional and Behavioral Correlates

The association of enuresis and emotional/behavioral problems has had a longstanding history as documented in the professional literature (see review by Glicklich, 1951). Early research attempts were hampered by poor methodological procedures that cast doubt upon the findings (Werry, 1967). In addition, a self-fulfilling prophecy evolved as many clinicians presumed enuresis to be a form of psychopathology. Cust (1952) found a similar attitude on the part of mothers of enuretic children; the most frequently cited cause of a child's bedwetting was "nerves and emotional stress" (Cust, 1952, p. 1169). This attitude along with strict adherence to particular theoretical orientations provided enuresis with limited descriptive data which hampered the empirical search for causal explanations.

Although an association may exist between enuresis and emotional/behavioral problems, the nature of that relationship remains unclear. Werry (1967) posited five different forms which the association could take:

psychogenic, psycho-additive, somatopsychic, vicious circle effects, and coincidental. The psychogenic type represents the traditional belief that enuresis is a result of emotional stress of psychological disturbance. The reverse of this relationship is the somatopsychic condition in which the enuresis is caused by organic factors and the psychopathology is a result of the shame and anxiety produced by the somatic symptom. Psycho-additive cases can be attributed to somatic etiology but the condition is aggravated by the existence of concomitant emotional problems. This form is similar to the vicious circle effects that result when psychogenic factors bring about somatic complications which in turn cause further emotional problems.

Consideration of these four relationships suggests the deep and involved interpretations that can be made regarding enuresis. Clinicians typically search for evidence that might provide a causal link between enuresis and emotional/behavioral disturbance. However, they tend to overlook the possibility that the manifestation of both phenomena may be no more than coincidental. Werry (1967) cautions that this lack of relationship may be the case in more instances than is commonly believed.

Investigations into the possible association between enuresis and emotional/behavioral problems have considered the extent to which bedwetting represents a form of psychiatric disorder. It appears that less than a third of the

children who exhibit enuretic behavior actually show signs of psychiatric disturbance (see review by Shaffer, 1973). Although this rate is higher than the 10-15% figure found in the general population (Hallgren, 1957), it does not account for a majority of enuretic cases. Approaching the question from a different perspective, Rutter, Tizard, and Whitmore (1970) found a higher rate of enuresis among psychiatrically disturbed youngsters (24-30%) than with normal children (4-7%). In those cases where a relationship has been found, there is once again a lack of evidence to indicate whether bedwetting brings about a psychiatric disturbance or if the disturbance can be considered the driving force behind the enuresis.

Although most enuretic children do not exhibit overt signs of psychiatric disorder, more subtle emotional and behavioral problems may exist. Tapia, Jekel, and Domke (1960) found no significant difference in the emotional adjustment of enuretic and nonenuretic youngsters, but later studies have reported an association between enuresis and certain emotional characteristics. Oppel et al. (1968a) compared a group of 7-year-olds who exhibited primary enuresis with a group of nonenuretic controls of the same age. They found that the enuretic youngsters were more sensitive and withdrawn, were more likely to suppress feelings, had less ambition, and were less likely to exhibit a fear of failure.

Wolkind (1976) indicated that enuretic 4-year-olds were more likely to exhibit dependency problems, temper tantrums, and management problems than was a comparison group of nonenuretic youngsters at age 4. However, no history of bladder control was collected in this study so there was no differentiation made between primary and secondary enuresis. The need for such a distinction was indicated by Kolvin et al. (1972) who found that secondary enuretics were significantly more solitary, fearful, and obsessive than primary enuretics. Although there was no significant difference between the two groups in regard to sensitivity, the percentage of children exhibiting this characteristic was very high (62% with primary enuresis and 81% with secondary enuresis).

These results lend some support to the notion given by Shaffer (1973) that children who exhibit enuretic behavior are probably distressed by their problem. But Kolvin et al. (1972) indicated "the picture that emerged (from parent reports) was of a cheerful and easygoing group of children" (p. 717). They described the children as "quite unexceptionally average" (Kolvin et al., 1972, p. 718), an observation reiterated by Sacks et al. (1974) whose entire sample of enuretic children was within the normal range of adjustment. For this reason, measurement of emotional/behavioral problems will require instruments sensitive to the subtle changes that might occur and assessment procedures that attempt to minimize error.

Parent ratings of the child's behavior and emotional adjustment are commonly used in enuresis research (Baker, 1969; Kolvin et al., 1972; Rutter et al., 1973; Sacks et al., 1974; Tapia et al., 1960; Wolkind, 1976). Some studies have collected additional information from the child's teacher for those youngsters of school age (Baker, 1969; Rutter et al., 1973; Sacks et al., 1974; Tapia et al., 1960). The data obtained from parents and teachers may sometimes be contradictory (Rutter et al., 1973). One possible explanation for this disparity is that behaviors are situation specific to either home or school. The child who is withdrawn and sensitive around classmates may be talkative and relatively confident when at home in the family setting. It is also possible that evaluations are affected by expectation bias or halo effects. This applies particularly to parent ratings which are done with full knowledge of the child's bedwetting history, the data of admission to treatment, and the child's response to the intervention program. Such factors are less likely to affect ratings done by teachers, who are typically unaware of a child's bedwetting problem.

Parents and teachers have not been the only sources of information utilized in enuresis research. Data have also been collected from the children with the use of a variety of assessment tools. The Stanford-Binet and the Wechsler Intelligence Scale for Children have been used as IQ

measures (Oppel et al., 1968a; Scallan & Herron, 1969). Personality characteristics have been investigated with the Rorschach, the Cattell Personality Questionnaire, the Children's Personality Questionnaire, the Children's Embedded-Figures Test, the Draw-A-Person and Draw-Your-Family Tests, to name a few (Baker, 1969; Campbell, Weissman & Lupp, 1970; DeLuca, 1968; Kolvin et al., 1972; Sacks et al., 1974).

An individual assessment at a particular point in time provides important information about an enuretic child. It gives the clinician an idea of how the child compares with normative standards computed from the population at-large. However, this approach provides no within-subject comparative data that can be used to assess change over time, something which is of interest to those who study the efficacy of treatment techniques. To achieve this purpose, it is necessary to administer multiple assessments, typically before and after treatment intervention.

Controlled research in regard to changes in emotional/behavioral correlates over time is limited. Baker (1969) utilized such a design when he studied the relationship between symptomatic treatment of enuresis and the phenomenon of symptom substitution. The results of his investigation indicated that children who were cured of their enuresis were happier, less anxious, and more mature following treatment. In addition, there was an improvement in self-image and there appeared to be a positive change in regard

to parent-child relationships. It is true that all children in this study showed evidence of change in a positive direction, but those youngsters who exhibited an improvement in enuresis demonstrated a significantly greater change in emotional/behavioral correlates than did controls and children for whom enuretic symptoms remained unchanged. Baker (1969) not only found support for his primary hypothesis that symptomatic treatment would not result in symptom substitution, he also found that the changes which did occur with symptomatic treatment were in a positive direction and were at a statistically significant level.

A later study by Sacks et al. (1974) addressed the same question studied by Baker (1969). Sacks et al. (1974) found that children assigned to three treatment groups (conditioning, psychotherapy, and control) all demonstrated significant declines in psychological symptoms across time as measured by parent responses to the Staten Island Behavior Scale. These results occurred irrespective of treatment outcome: those who were not cured exhibited a drop in psychological symptoms similar to the youngsters who had attained bladder control. Although they found no evidence for symptom substitution, Sacks et al. (1974) were unable to correlate successful treatment outcome with positive psychological and behavioral change. As a result, the controlled research available at the present time contains conflicting evidence.

Since pharmacological treatment is commonly used with enuresis, it is important to consider possible psychotropic effects when assessing emotional/behavioral correlates of treatment intervention. Using a double-blind, placebo-controlled, crossover design, Werry et al. (1975) conducted a three-week study to investigate possible side effects of imipramine treatment for enuresis. The authors found a post-treatment reduction in conduct problems, an increase in sedation or slowing, plus a greater degree of cooperativeness and happiness. There was a significant correlation between behavioral improvement and decrease in wetting frequency. Although this might be interpreted as a causal relationship between control of bedwetting and behavioral improvement, Werry et al. (1975) opted for a psychopharmacological explanation.

The present investigation built upon the findings of Baker (1969), Sacks et al. (1974), and Werry et al. (1975). The study represents the first direct comparison of imipramine pharmacotherapy and conditioning treatment using the clinically significant dependent variable of cured vs. not cured. In addition, the investigation focused on positive secondary effects. This was done in two ways. First, change in emotional and behavioral adjustment was related to treatment outcome. Second, an investigation of possible psychotropic effects from pharmacotherapy was conducted by studying the relationship of treatment modality to emotional

and behavioral correlates. In this way, the present study examined the efficacy of the two most commonly used intervention strategies for enuresis, and it also studied treatment modality and outcome relative to the total life experience of the child.

CHAPTER III METHODOLOGY

The purpose of this study was to investigate the difference in efficacy of the two most commonly used treatment approaches for primary nocturnal enuresis, pharmacotherapy with imipramine hydrochloride and behavioral conditioning using a urine alarm. The study also examined the relationship of primary nocturnal enuresis and its methods of treatment with subjects' level of emotional and behavioral adjustment. An attempt was made to identify pre-treatment predictors of treatment outcome and premature withdrawal from treatment. The investigation utilized a pretest-posttest control group design (Campbell & Stanley, 1973).

Subjects

The subjects involved in the present study were male and female children and adolescents, ages 6 through 16. Subjects were recruited for the program in a variety of ways: referrals from local clinics and private physicians, advertisements in newspapers and on television, plus contact with school personnel in Alachua County, Florida. The

parents of 148 children and adolescents inquired about the treatment program. From this total, 49 subjects, 40 males and 9 females, were formally enrolled in the study; 36 subjects actually completed all facets of the 15-week program.

All subjects received an initial screening performed by a licensed physician in the Department of Pediatrics at Shands Teaching Hospital, Gainesville, Florida. This examination was designed to assess the extent to which a child's enuresis was the result of physical or neurological abnormalities. Subjects found to exhibit such signs were not included in the study. Only those children referred for primary nocturnal enuresis were considered for the study sample. This information was obtained by questioning the parent(s) regarding the child's wetting history. Each child was also to have a minimum baseline wetting frequency of three wet nights per week. Data for this criterion were collected by parents for a period of at least seven days prior to the child's initial clinic visit. All but one of the subjects in the study sample met the frequency criterion. The one child who did not meet the criterion had wet only twice during baseline although his parents reported that he typically wet more frequently, an observation that was confirmed after the child was randomly assigned to the waiting list condition.

During the screening process the child and parent(s) were informed of the nature and purpose of the investigation. All parents were informed of the necessity for weekly visits to Shands Teaching Hospital should conditioning be allotted to their child. They were also told that pharmacotherapy would require bimonthly appointments at Shands. Parents who decided to enroll their youngster in the study were asked to sign a consent form (see Appendix A). The child and parent(s) were then administered the assessment instruments described in the section below.

Following the clinic examination, subjects were randomly assigned to one of the three treatment conditions. Parents were then informed of the intervention program assigned to their child. Appropriate appointments were scheduled for those children enrolled in the conditioning and pharmacotherapy groups. The parents of children allotted to the control group were informed that a waiting period would be necessary due to the large number of children seeking treatment. These individuals were guaranteed access to treatment following their period of time on the waiting list.

Hypotheses

The following null hypotheses were developed from the questions stated in Chapter I.

- HO₁ There is no significant difference in treatment outcome for subjects given conditioning treatment, pharmacotherapy with imipramine hydrochloride, or assignment to a clinical waiting list.
- HO₂ There is no significant difference in emotional and behavioral adjustment for children cured of primary nocturnal enuresis as compared with children for whom enuretic symptoms remain.
- HO₃ There is no significant difference in the emotional and behavioral adjustment of children as a result of the method of treatment received for primary nocturnal enuresis.
- HO₄ There is no pre-treatment variable which can significantly predict the outcome of treatment for primary nocturnal enuresis.
- HO₅ There is no pre-treatment variable which can significantly predict premature withdrawal from treatment for primary nocturnal enuresis.

Instrumentation

The majority of assessment measures chosen for this study were selected to provide data relevant to subjects' emotional and behavioral adjustment. Data were also collected regarding parent attitudes toward bedwetting. Children provided a self-report of their emotional and behavioral

adjustment using the Piers-Harris Children's Self-Concept Scale and What I Think and Feel, a revised version of the Children's Manifest Anxiety Scale. An additional inventory, titled This Week, was developed for use in this study as a weekly measure of subjects' emotional and behavioral adjustment. The Peabody Picture Vocabulary Test was also included in the child's test battery as a measure of verbal intelligence. Parent attitudes toward bedwetting were assessed using the Tolerance and Nuisance Scales for Enuresis. Parents rated their child's emotional and behavioral adjustment using the Personality Inventory for Children and the Behavior Problem Checklist.

Child Self-Report Measures

Piers-Harris Children's Self-Concept Scale

The Piers-Harris Children's Self-Concept Scale, subtitled The Way I Feel About Myself, is a paper-and-pencil, self-report inventory. It was originally published in 1969 by Ellen V. Piers and Dale B. Harris and is currently distributed by Counselor Recordings and Tests of Nashville, Tennessee. The instrument was designed to investigate the development of self attitudes in children. It has been used successfully with groups of children in grades 3 through 12. The inventory can be administered to youngsters below

that level if done on an individual basis and if the examiner reads the statements to the child.

The Piers-Harris contains eighty declarative statements that describe various personal characteristics (e.g., "I am cheerful"). All items are presented in a forced-choice format. The examinee is asked to respond "Yes" to those items that generally apply to him and "No" to the items that are inappropriate. In order to minimize error due to acquiescence, at least half of the statements on the inventory are negative in content (e.g., "I am unpopular").

Instructions for administration and scoring are provided in the manual that accompanies the instrument (Piers & Harris, 1969). In order to reduce the effects of social desirability it is important that the examiner instruct youngsters to describe themselves as they are and not as they think they should be. Scoring is relatively easy with the use of a special key that identifies "positive" responses. High scores indicate high, or a more adequate self-concept.

Piers and Harris (1969) provided normative data, including the mean (51.84), median (53.43), and standard deviation (13.87) for their original sample of 1183 school children. The authors caution against indiscriminate use of these standards since they were obtained from a single school district in Pennsylvania which would limit the generalizability of the results. This suggestion is supported by data collected from other samples in which the

mean varied from 50.4 to 60.50 and the standard deviation ranged from 9.15 to 15.19 (Piers & Harris, 1969).

Scores on the Piers-Harris appear to be negatively skewed. The authors believe this tendency toward positive results is influenced by the effects of social desirability. Although very high scores, as well as low scores, could be attributed to "faking" response sets, Piers and Harris (1969) believe that children are less likely than adults to make such deliberate attempts at distortion. Given the error inherent in high scores, serious attention is typically reserved for low results which are interpreted as indications of low self-concept. As Piers and Harris (1969, p. 15) state, "while we cannot assume that all high scores (particularly the very high) reflect truly positive self-attitudes, we probably can assume that low scores reflect truly negative self-attitudes."

Most of the reliability data presented in the manual was computed with an earlier form of the Piers-Harris that contained 95 items. Piers and Harris (1964) reported that coefficients of internal consistency for different grade levels varied from .78 to .93 using the Kuder-Richardson formula 21. A reanalysis of sixth and tenth grade results using the Spearman-Brown-odd-even formula revealed coefficients of .90 and .87 (Piers & Harris, 1964). Test-retest reliability for the same sample was computed over a four-month period with resulting correlations of approximately .72. Wing (1966) utilized the current eighty-item format

and obtained test-retest coefficients of .77 for both two-month and four-month periods. Smith and Rogers (1977) reported more impressive stability data with a correlation of .62 for a test-retest interval of approximately seven months. Piers and Harris (1969) caution that scores do tend to improve upon retest and they recommend that score changes of less than ten points be ignored.

Mayer (1965) compared results from the Piers-Harris with those obtained from Lipsitt's Children's Self-Concept Scale and obtained a concurrent validity coefficient of .80. Cox (1966) compared Piers-Harris scores with big problems endorsed on the SRA Junior Inventory and obtained a correlation of -.64. Comparisons have also been made with other variables, but the Piers-Harris correlations with IQ (-.04 to .48) and achievement (.06 to .43) have not approached the results cited above. The inventory appears to be more highly correlated with self-concept than with other pertinent variables. No data are presented in the manual in regard to the predictive validity of the Piers-Harris.

The Piers-Harris was selected for use in the present study because of its intended focus and its suitability for the age group under investigation. In addition, the instrument is shorter than certain others (e.g., Children's Personality Questionnaire). It was also assumed that the respectable test-retest reliability data would make it a desirable pre- and post-treatment measure for use in the current 15-week study.

What I Think and Feel: A Revision of the Children's
Manifest Anxiety Scale

Castaneda, McCandless, and Palermo (1956) developed a children's version of Taylor's Manifest Anxiety Scale (Taylor, 1951). Titled the Children's Manifest Anxiety Scale (CMAS), the inventory has been a popular instrument in child research and is cited in over 100 articles (Reynolds & Richmond, 1978). The CMAS has been used in enuresis research by Morgan and Young (1975) and found to correlate significantly with mothers' results on the authors' Nuisance Scale for Enuresis.

Despite the instrument's popularity, Reynolds and Richmond (1978) felt that the CMAS was in need of revision for a variety of reasons. By decreasing the number of items on the inventory and by adjusting the reading level so the instrument was more appropriate for primary school children, Reynolds and Richmond (1978) believed that a better self-report scale for anxiety in children could be developed.

Reynolds and Richmond (1978) called their CMAS revision "What I Think and Feel" (see Appendix C). The 37-item scale includes 28 statements related to anxiety plus a 9-item Lie scale. The 37 statements were selected from a pool of 73 items that were administered to a group of 329 school age children in grades 1 through 12.

An estimate of reliability was computed using the finalized inventory with the original sample and a cross-validation group of 107 children from grades 2, 5, 9,

10, and 11. Anxiety scale items yielded a KR-20 reliability estimate of .83 in the original sample with an estimate of .85 for the cross-validation group. Lie-scale items that did not correlate with other Lie statements were eliminated as were any Lie items that correlated above .30 with the Anxiety scale. Of the original eleven statements on the Lie scale, nine were included in the final version of the test.

Test items can be read to youngsters in grades 1 and 2, but children above this level should have little difficulty reading and understanding the inventory. The child responds to test items by endorsing "Yes" or "No" on the test blank. The instrument is scored by tallying the number of "Yes" responses to items on the Anxiety and Lie scales. Individual results are then compared with normative data provided by Reynolds and Richmond (1978).

"What I Think and Feel" was included in the present study because it provides an efficient means of assessing a child's level of anxiety. Lie-scale items on the inventory also give some indication of a child's response set. This was an important consideration since the present study also had subjects complete the Piers-Harris Children's Self-Concept Scale, an inventory whose results are susceptible to the effects of social desirability.

This Week

This Week is a four-item questionnaire (see Appendix D) designed for use in the present study. This self-report inventory was completed every Friday by all children in the pharmacotherapy and waiting list groups. Children who received conditioning treatment completed the inventory during their weekly visit to Shands. When treatment was terminated for these children, they also completed the questionnaire on Friday. The measure utilizes a Likert-type scale in which individual items contain a continuum of happy-sad faces that correlate with "strongly agree" - "strongly disagree" responses. Subjects are instructed to read each statement and circle the picture that best describes their evaluation of the item. All items are stated in a positive manner with words such as "happy" and "good" represented by happy faces.

All parents were asked to collect data regarding their child's nightly wetting behavior. It was hypothesized that a decrease or elimination of bedwetting would produce an improvement in a child's evaluation of self. This Week was designed as an ongoing measure of self-evaluation that could be easily completed by every child. Subjects were administered the inventory during the initial clinic session and once each week for the remainder of the study period. It was anticipated that the nonspecific nature of the items would provide some indication of the extent to which

improvement in enuresis generalizes to other aspects of a child's life.

Peabody Picture Vocabulary Test

The Peabody Picture Vocabulary Test (PPVT) was published in 1959 by Lloyd M. Dunn. Distributed by American Guidance Service, Inc., this instrument was designed to provide an estimate of an individual's verbal intelligence. The PPVT has been used with retardates, emotionally and physically handicapped youngsters, deaf children, schizophrenics, and normal youngsters. Dunn (1965) indicated that the test can be used with "any English speaking resident of the United States between 2 years 6 months and 18 years who is able to hear words, see the drawings, and has the facility to indicate 'yes' and 'no' in a manner which communicates" (p. 25).

The PPVT consists of pictorial representations of 600 stimulus words contained on 150 plates, with four equally sized pictures assigned to each plate. Two word lists, Forms A and B, are used with the same pictorial plates and allow for repeated testing within a relatively brief period of time. Alternate-form reliability coefficients for the PPVT range from .67 at the 6-year level to .84 at the 17- and 18-year levels. On both forms the stimulus words are arranged in order of increasing difficulty with the subject responding only to those items between his

basal level (eight consecutive correct answers) and ceiling level (six failures out of eight consecutive responses).

The PPVT is not a timed test although it typically requires about 10-15 minutes to administer. Scoring is objective and is easily accomplished within a few minutes. An individual's raw score can be converted to a percentile rank, a mental age, or a standard score deviation IQ with a mean of 100 and a standard deviation of 15.

Standardization of the PPVT was done with a group of 4,012 white children and youth living in and around Nashville, Tennessee. Limited data is available on test-retest reliability. While Budoff and Purseglove (1963) found a correlation of .87 over an inter-test interval of one month, Moed, Wight, and James (1963) reported a reliability coefficient of .88 over a one-year interval.

Dunn (1965) reported that investigations of the statistical validity of the PPVT outnumber reliability studies by a three-to-one margin. The congruent validity of the instrument, when correlated with other intellectual measures, is best when comparisons are made with scores from the verbal scales of these measures. PPVT deviation IQ scores and verbal scale results from the Wechsler Intelligence Scale for Children (WISC) correlate over a range of .41 to .74 with a median of .67. Correlations with WISC full-scale scores range from .30 to .84 with a median of .61 and with WISC performance scale scores over a range of .19 to .82 with a median of .39.

Concurrent validity results have been obtained by correlating the PPVT with measures of scholastic achievement. Comparisons were made with the Sequential Tests of Educational Progress, the California Achievement Tests, the Wide Range Achievement Test, the Stanford Achievement Tests, the Metropolitan Achievement Tests, the Gray-Votaw-Rogers Achievement Tests, and teacher ratings of school achievement. Dunn (1965) provided a summary of correlation coefficients for the above: two were in the .30's, seven in the 40's, seven in the .50's, seven in the .60's, one in the .70's, two in the .80's, and two in the .90's.

An intellectual evaluation was included in the present student to assess the role of cognitive functioning in treatment outcome. The PPVT was selected as the measurement instrument because it provides a quick and objective means of evaluating verbal intelligence and because it is appropriate for the age group under consideration. The PPVT was used as a pre-treatment measure only since little fluctuation in verbal intelligence would be anticipated over the course of the study period. The PPVT also provided a means of controlling for IQ differences among the treatment groups.

Parent-Report Measures

Tolerance Scale for Enuresis

The Tolerance Scale for Enuresis was developed by Morgan and Young (1975) as a means of assessing maternal attitudes toward enuresis. The instrument consists of twenty declarative statements which reflect a tolerance/intolerance dimension (see Appendix B). Each item is assigned a weighted scale score with higher values representing greater degrees of intolerance toward bedwetting. A person's total score is the median scale value of all items to which the individual responds affirmatively.

Morgan and Young (1975) first obtained tolerance scores from a clinical sample of 134 mothers who brought their children to an outpatient clinic for treatment of nocturnal enuresis. Scores for these subjects ranged from 1.25 to 3.425 with a median and modal score of 1.45. Split-half reliability was 0.43; no test-retest reliability data were reported.

The scale does appear to have some degree of predictive validity since mothers who prematurely withdrew their children from treatment had significantly higher intolerance scores than mothers who completed treatment. However, intolerance scores were not related to the rate of therapeutic outcome. In addition, there was no significant relationship found between mothers' scores and parent or child expectation of treatment outcome.

The results of the Morgan and Young (1975) study indicated that mothers' primary concern was that their children exhibited enuretic behavior. There was no apparent significance accorded to the severity of the problem, the age of the child, or the nature of the bedwetting problem (primary vs. secondary). Given the available evidence on parent attitudes (Nilsson et al., 1973; Oppel et al., 1968a; Umphress et al., 1970; Wolkind, 1976), the Tolerance Scale would appear to be a valuable component of research in childhood enuresis.

The instrument was utilized as both a pre- and post-treatment measure in the present study. Pre-treatment results from the Tolerance Scale were used to study the relationship between treatment outcome and initial parent attitudes toward enuresis and to assess the measure's predictive validity regarding premature withdrawal from treatment. Pre- and post-treatment results were also analyzed to assess parent attitude change relative to treatment outcome.

Nuisance Scale for Enuresis

The Nuisance Scale was devised by Morgan and Young (1975) and administered to the same sample of mothers who completed the Tolerance Scale for Enuresis in the study described above. The Nuisance Scale consists of 25 commonly reported childhood problems (see Appendix B). Parents are

asked to check the items which they consider to be worse than their child's bedwetting, regardless of whether their youngster actually exhibits the behavior in question.

The authors reported frequency data for the various problem behaviors. The items most often checked by mothers were "stealing" (100), "often spiteful and cruel" (92), and "running away" (91). No results were reported for the instrument's reliability or predictive validity. However, evidence exists for concurrent validity since the mother's nuisance value score was significantly correlated with the child's result on the Children's Manifest Anxiety Scale (Castaneda et al., 1956). This suggests that the level of a child's anxiety is somehow related to a mother's assessment of the nuisance value of the youngster's bedwetting.

In the current study, the Nuisance Scale was used as a pretest and posttest measure. As was described for the Tolerance Scale, pre-treatment results from the Nuisance Scale were used to study the relationship of initial parent attitudes with treatment outcome and premature withdrawal from treatment. Changes in parent attitudes were examined by comparing pre- and post-treatment results relative to treatment outcome.

Personality Inventory for Children

The Personality Inventory for Children (PIC) was originally published in 1958 by R. D. Wirt and W. E. Broen.

Utilizing the methodological approach outlined by Hathaway and McKinley (1951), the authors sought to develop an empirically and rationally constructed personality assessment tool for children that would resemble the Minnesota Multiphasic Personality Inventory (MMPI) which is commonly used with adults. Since its initial publication in 1958, the PIC has been normed and data have been collected in regard to scale construction, reliability, and validity.

Published by Western Psychological Services, the PIC is primarily designed for use with children from the ages of 6 through 16. The 600-item questionnaire is different from the MMPI in the sense that relevant data regarding the subject are collected from a secondary respondent, usually the child's mother. True/false answers are obtained which reflect the respondent's opinion of the child's behavior and personality characteristics plus information pertaining to family relationships. Responses are recorded on an answer sheet which can then be hand corrected with the use of special templates.

Like its MMPI model, the PIC contains both validity and clinical scales. The validity scales (Lie, F, Defensive-ness) assess the extent to which the respondent presents a distorted representation of the child. Twelve clinical scales measure achievement, development, somatic concern, depression, family relations, delinquency, withdrawal, anxiety, psychosis, hyperactivity, and social skills. A

gross intellectual screening is provided along with a measure of the child's overall psychological adjustment.

Scores for the individual scales are displayed on a profile sheet similar to that used with the MMPI. Three methods of profile interpretation are provided in the PIC manual (Wirt, Lachar, Klinedinst, & Seat, 1977). Linear and configural approaches to evaluation are supplemented in the manual with a variety of "typical" profiles which allow for direct comparison of individual results with configurations representative of particular childhood problems (e.g., over-inhibition, sexual deviation).

Wirt et al. (1977) cited test-retest reliability coefficients of .86 and .71. The first results were obtained from a sample of child psychiatry outpatients in which inter-test interval was randomized between 4 and 72 days, with an average of 15.2 days ($SD = 12.99$). Latter results were collected from a sample of 46 mothers of normal children. Test-retest interval in this study varied from 13 to 102 days, with a mean of 50.96 ($SD = 27.13$).

Wirt et al. (1977) reported inter-parent reliability. Father-mother correlations were computed for the 13 substantive scales (Adjustment through Social Skills). A coefficient of .69 was obtained when data were collected from a clinic sample of 184 parents. When results were computed for 146 parents of normal children, the correlation dropped to .59. Wirt et al. (1977) point out that these data may

not accurately describe the relative degree of inter-parent agreement since the variability of scores was very restricted in the normal sample.

Construct validity data for the PIC were obtained by correlating each scale with the other 15 scales on the instrument. In the PIC manual, Wirt et al. (1977) devoted extensive discussion to the interpretation of these results. Additional information is provided regarding criterion-related validity for one validity and five clinical scales.

Seventy-three mothers of boys evaluated at child guidance clinics were asked to complete the MMPI and the PIC Defensiveness Scale. Significant correlations were found between the Defensiveness Scale and the following MMPI scales: Paranoia (.46), Hypomania (.29), Psychasthenia (.24), Social Introversion (.23), and the K Scale (.28). High defensive mothers also presented high scores on the L Scale. On the other hand, low defensive mothers scored less favorably on Psychopathic Deviate, Hypomania, and Social Introversion.

The Achievement Scale on the PIC was designed to identify underachievers in school. Dunn and Markwardt (1970) correlated the Achievement Scale scores for 72 youngsters with their results from the Peabody Individual Achievement Test (PIAT). Coefficients indicated a $-.61$ correlation with PIAT reading comprehension, $-.42$ with math, and $-.59$ with total achievement on the PIAT. The PIC Intellectual Screening Scale was developed to locate those children for

whom poor academic performance was a result of intellectual impairment. Wirt et al. (1977) presented data for a sample of 75 clinic children in which Intellectual Screening scores correlated $-.40$ with the Peabody Picture Vocabulary Test and $-.31$ with the Porteus Maze Test Quotient. An additional coefficient of $-.55$ was cited but the criterion measure varied--"usually WISC-R, occasionally Stanford-Binet or WPPSI" (Wirt et al., 1977, p. 19).

The Delinquency Scale contains 47 items that were designed to measure delinquent tendencies. Lachar, Abato, and Wirt (1975) cited a criterion validity coefficient of $.90$ when scale scores were compared with group placement of 70 delinquents vs. 210 normal controls. The 36-item Hyperactivity Scale was designed to identify those children who exhibited those behaviors commonly associated with this disorder. A scale score to criterion validity coefficient of $.78$ was obtained by administering the Hyperactivity Scale to 80 hyperactive and 50 maladjusted non-hyperactive children selected from child guidance clinics.

The Psychotic Scale was organized as a device to discriminate normal youngsters from those with psychotic symptomatology. Lachar (1971) used the 40-item scale to differentiate psychotic and normal samples. The scale score to criterion validity coefficient was $.88$ for a construction group of 30 youngsters diagnosed as psychotic as compared with a sample of 300 normal children. A cross-validation

coefficient of .84 was obtained by comparing an additional 30 psychotic youngsters with the original normative sample.

The PIC was incorporated into the present study because of its overall scope and its ability to identify deviant response sets. The instrument provides information on items important to the study of enuresis: development, family relations, somatic concern, anxiety, withdrawal, social skills, and depression. Since it is completed by the parent(s), the PIC provides data regarding the child which can then be compared with results obtained directly from the child. The complete instrument was used as a pre-treatment measure in the present study. Due to the extreme length of the inventory, post-treatment data were collected for only those subscales where it was anticipated that participation in treatment might have influenced the scores. The original 600-item measure was shortened to 281 questions which provided post-treatment data for the following subscales: Lie, F, Defensiveness, Adjustment, Depression, Family Relations, Delinquency, Withdrawal, Anxiety, Hyperactivity, and Social Skills.

Behavior Problem Checklist

The Behavior Problem Checklist (BPC) is a 55-item questionnaire developed by Peterson (1961) to assess problem behaviors that occur during childhood and adolescence. A variety of behavior problems are covered by inventory

items (e.g., "temper tantrums," "social withdrawal," "short attention span," or "truancy from school"). Individuals who are familiar with the youngster in question complete the checklist by rating each item on a three-point scale ("2" = a severe problem, "1" = a mild problem, "0" = not a problem).

Factor analytic studies have identified three primary subscales (Conduct Problem, Personality Problem, and Inadequacy-Immaturity) and one secondary subscale (Socialized Delinquency). The BPC also contains four items which serve as an alert mechanism for autism and childhood psychosis. Although the four primary and secondary dimensions are orthogonal, correlations do exist between subscale scores since these values are only estimates of the true factor scores for the four dimensions. The Conduct Problem (CP), Personality Problem (PP), and Socialized Delinquency (SD) subscales are independent but Inadequacy-Immaturity (II) relates to the Conduct Problem and Personality Problem subscales in varying degrees with correlations reported from .21 to .72 (Quay & Peterson, 1975).

The BPC utilizes an objective scoring approach which requires no more than five minutes to complete. Although the instrument was designed to use weighted scores (adding "ones" and "twos"), unweighted scores (tallying both "ones" and "twos" as "ones") correlate so highly with weighted scores (.98 to .99) that Quay and Peterson (1975) recommend

the use of the unweighted method. In this manner the score for a particular subscale is the total number of items checked either "1" or "2".

Once an individual's scores are completed for the four subscales, a comparison is made with appropriate normative data. The authors recommend the development of local norms when large scale use is made of the BPC. This is necessary since the frequency of deviant behavior varies according to age, race, sex, observational setting, and type of rater used. For the purpose of individual comparisons, the Manual for the Behavior Problem Checklist (Quay & Peterson, 1975) provides normative data on a variety of populations (e.g., rural black children, inner-city elementary school children and hospitalized adolescents).

Since items for the BPC were originally selected from a large number of case reports, the authors believe the instrument does possess content validity in regard to the variety of deviant behaviors exhibited by children and adolescents. Speer (1971) reported data on the concurrent validity of the BPC obtained from a comparison of clinic children with their siblings and a group of nonclinic youngsters. The BPC reliably and significantly differentiated the clinic group from their siblings and the non-clinic sample on the three primary subscales. Zold and Speer (1971) were able to replicate these results with the additional finding that the BPC was able to reflect changes

occurring between admission to and termination from treatment.

Quay and Peterson (1975) reported that the BPC subscales possess split-half reliabilities of .92 (CP), .81 (PP), and .26 (II) and Kudor-Richardson Formula 20 reliabilities of .89 (C), .83 (PP), and .68 (II). No data were presented for the Socialized Delinquency subscale. Measures of inter-rater reliability depend upon the extent to which the rater knows the child being observed, the amount of time the individual spends with the child, and the similarity of the observation setting.

The BPC was incorporated into the current study because of its proven ability as a behavior rating device. Since the present study focused on changes in behavioral correlates of enuresis, the BPC was administered as both a pre- and post-treatment measure. Data were collected from the parent(s) accompanying the child to the initial clinic visit.

Procedures

Collection of Baseline Data

Prior to the administration of pre-treatment measures, all parents were instructed to collect at least seven nights of baseline data on their child's wetting frequency. Parents were provided with copies of the wetting frequency record

(see Appendix E) on which they were to record a "D" for each dry night and a "W" for each night their child wet the bed.

Treatment Format

As stated previously, subjects were randomly assigned to treatment groups during the initial clinic visit. Individuals assigned to the pharmacotherapy program were provided with a prescription for imipramine hydrochloride which could be filled at a local pharmacy. Children in the conditioning group were given an initial treatment appointment which typically occurred within seven days of the clinic visit.

Parents of children assigned to the waiting list group were provided with a two week supply of This Week inventories and wetting frequency records. Parents were also given stamped envelopes addressed to the experimenter's attention which they were instructed to use to return information to the experimenter on a weekly basis. During the remainder of the 14-week period, additional supplies of This Week inventories, wetting frequency records, and stamped envelopes were mailed to parents by the experimenter on a bi-weekly basis.

Children in the pharmacotherapy program received a dosage level of imipramine hydrochloride appropriate for their age and body weight. The decisions regarding dosage

level were made by licensed physicians in the Department of Pediatrics at Shands. Typically, younger and smaller children received a dosage level of 25 mg. of imipramine per day while older and larger children received 50 mg. Consistent with normal clinic procedure, children in the pharmacotherapy group returned to clinic six weeks after their initial visit in order to have their enuresis condition re-evaluated and to receive adjustments, if necessary, in the dosage level of the medication. One subject, who was wetting profusely upon return to clinic for the six-week visit, was maintained on imipramine hydrochloride and started on oxybutynin chloride ('Ditropan'), another medication used in the treatment of nocturnal enuresis. The child was continued in the study because his wetting frequency did not change and because such changes in medication are standard policy for treatment received through the Department of Pediatrics at Shands.

All other experimental conditions for the pharmacotherapy group were the same as those outlined above for waiting list subjects. This Week inventories, wetting frequency records, and stamped envelopes were mailed to parents on a biweekly basis. Parents were asked to forward information by return mail to the experimenter on a weekly basis.

During their second meeting in the clinic, the parents and children assigned to the conditioning method received instructions in the use of the alarm apparatus. The specific

procedures to be followed were discussed and an explanation of the alarm mechanism was provided. The parents and the child were given a written summary of this information which they were to take home as reference material (see Appendix F). Parents were provided with an alarm apparatus which they were required to return upon termination of treatment.

All subjects assigned to the conditioning program were given weekly appointments with either the experimenter or a graduate student volunteer from the Department of Clinical Psychology at Shands. The parent(s) and the child were typically seen together during the weekly sessions. The focus of discussion was the child's wetting frequency during the previous week. Interaction with the child involved discussion of significant life events that occurred during the week, relationships with family and peers, and the child's experience with the urine alarm. Parents were encouraged to discuss problems they were having with their child, events they considered to be important to their youngster's treatment, and problems they may have encountered in the use of the alarm. Parents were given wetting frequency records during the treatment sessions and were asked to return them on a weekly basis. This Week inventories were administered to conditioning subjects during the weekly sessions.

All participants in the study were charged a minimal fee of \$7.50 for the initial urological examination provided

by the Department of Pediatrics. Subjects assigned to pharmacotherapy were provided treatment at a reduced rate of \$7.50 per visit through the Department of Pediatrics. Subjects who received conditioning treatment were charged for sessions according to a sliding-scale, ability-to-pay arrangement. The total fee for all sessions ranged from a minimum of \$15.00 to a maximum of \$150.00.

Collection of Posttest Data

Posttest data were collected immediately following the point at which a child attained cure criterion of 14 consecutive dry nights or at the end of the 14-week treatment period, whichever came first. Parents completed the Enuresis Nuisance and Tolerance Scales, the Personality Inventory for Children, and the Behavior Problem Checklist. Post-treatment results on the Piers-Harris and What I Think and Feel scale were obtained from every youngster. Regardless of when a child attained cure criterion, wetting frequency data and This Week results were collected for the entire study period.

Successful conditioning subjects provided post-treatment data during the weekly session immediately following the attainment of cure criterion. Parents assigned to the waiting-list control and pharmacotherapy conditions were instructed to contact the experimenter when their child reached cure criterion. Arrangements were then made for the

family to return to the clinic and provide posttest data. Subjects from all treatment conditions who did not reach cure criterion by the end of the study period were brought to the clinic and administered posttest measures. For those control subjects who continued to exhibit enuretic behavior, arrangements were then made to initiate conditioning treatment, if the parents so desired. Parents of children who received pharmacotherapy were also given the opportunity to begin conditioning treatment, although the option of no treatment or continued use of the medication was available.

Analysis of the Data

Wetting frequency data collected in the present study did not meet the assumption of normality required for parametric analysis. This was particularly true for data obtained from subjects in the conditioning group where approximately half of the children were no longer wetting after the eighth week of treatment. As a result, data were tested for significance using two nonparametric procedures, the Kruskal-Wallis one-way analysis of variance by ranks and the Wilcoxon rank-sum test, an equivalent of the Mann Whitney U-Test (Siegel, 1956).

All comparisons of wetting frequency data were made across treatment groups by week of treatment (3 X 15). Fifteen separate Kruskal-Wallis tests were run to locate

overall significant differences among treatment groups for each of the 14 weeks of treatment and the week of baseline. For each week in which overall significance was found, three separate Wilcoxon rank-sum tests were run to locate the source of the difference: conditioning vs. waiting list, pharmacotherapy vs. waiting list, and conditioning vs. pharmacotherapy.

A pretest-posttest control group design with two between subject factors (Treatment = Conditioning vs. Pharmacotherapy vs. Waiting List; Outcome = Cured vs. Not Cured) and one within subject factor (Time = Pretest vs. Posttest) was used to study the effect of treatment method and treatment outcome on subjects' emotional and behavioral adjustment. Due to the possible interaction of factors, a repeated measures multivariate analysis was used. Variables related to emotional and behavioral adjustment were organized into three conceptually coherent groups and three separate MANOVA procedures were conducted.

The first group of variables included child self-report data (Piers-Harris Children's Self-Concept Scale and the anxiety subscale of What I Think and Feel). The second and third groups were parent ratings of each subject. These data were analyzed by instrument because of the internal consistency and cohesiveness of each questionnaire. The second group involved parent responses to eight Personality Inventory for Children subscales (Adjustment, Depression,

Family Relations, Delinquency, Withdrawal, Anxiety, Hyperactivity, and Social Skills). The last group included five scores obtained from the Behavior Problem Checklist (total score plus subscale scores for Conduct Problem, Personality Problem, Inadequacy-Immaturity, and Socialized Delinquency).

The two level definition of the factor Outcome (Cured vs. Not Cured) assessed the effect that elimination of nighttime wetting had on subjects' emotional and behavioral adjustment. However, it was hypothesized that changes in adjustment may also occur as a result of a clinically significant reduction in wetting behavior. This effect was studied by redefining Outcome as the child's wetting frequency during week #14, the final week of treatment. For this analysis children were categorized as (1) 0% wetting at week #14, (2) wetting $\leq$ 50% of baseline wetting frequency, (3) wetting $>$ 50% of baseline frequency. Subjects' adjustment data were re-analyzed using the new definition for Outcome. The analysis utilized a multivariate procedure identical to that used for the two-level classification of Outcome: two between subject factors (Treatment = Conditioning vs. Pharmacotherapy vs. Waiting List; Outcome = 0% Wetting vs. $\leq$ 50% of Baseline vs. $>$ 50% of Baseline) and one within subject factor (Time = Pretest vs. Posttest).

Weekly fluctuation in subjects' emotional adjustment relative to their wetting frequency was assessed using This Week. Data from this measure were analyzed in five different

ways: This Week total score (4-20) plus the score (1-5) obtained for each of the four statements on the inventory. Each score was correlated individually with the child's wetting frequency during the seven nights prior to completion of the instrument. Correlations were computed by subject since the focus of the analysis was the relationship between each individual's wetting frequency and the response pattern to This Week items. Since the data collected with this inventory were ordinal in nature, a Spearman's rank order coefficient was used in the analysis.

Parent attitudes toward bedwetting, as measured by the Tolerance and Nuisance Scales for Enuresis, were analyzed using two between subject factors (Treatment = Conditioning vs. Pharmacotherapy vs. Waiting List; Outcome = Cured vs. Not Cured) and one within subject factor (Time = Pretest vs. Posttest). A repeated measures multivariate analysis was used. After the data were analyzed to study the effect of the elimination of wetting behavior, attention was focused on possible changes in parent attitudes resulting from a clinically significant reduction in wetting. This multivariate analysis involved the use of two between subject factors (Treatment = Conditioning vs. Pharmacotherapy vs. Waiting List; Outcome = 0% Wetting vs. $\leq$ 50% of Baseline vs. $>$ 50% of Baseline) and one within subject factor (Time = Pretest vs. Posttest).

When predictors of treatment outcome were examined, only pretest scores were used in the analysis. A multivariate

procedure was conducted using one between subject factor (Outcome = Cured vs. Not Cured). A separate MANOVA procedure was run for each of four conceptually coherent groups of data: child self-report, parent responses to the Personality Inventory for Children, parent report on the Behavior Problem Checklist, and parent attitudes toward nocturnal enuresis. Data were also analyzed to locate predictors of a clinically significant reduction in wetting during the final week of treatment. The multivariate procedure involved the use of one between subject factor (Outcome = % Wetting vs. $\leq$ 50% of Baseline vs. $>$ 50% of Baseline).

A new between subject factor, Group, was defined when analysis focused on predictors of premature withdrawal from treatment. Group was a two level factor, people who completed all aspects of their assigned treatment program vs. those who did not. Again, a MANOVA procedure was conducted on pretreatment data for each of the four conceptually coherent groups mentioned above. Since Morgan and Young (1975) had presented evidence supporting the predictive validity of their Tolerance Scale for Enuresis, individual t-tests were computed to assess this inventory's ability to differentiate subjects who did and did not complete each of the three treatment programs.

CHAPTER IV RESULTS

The purpose of this study was to examine the effectiveness of the two most commonly used methods of treating primary nocturnal enuresis in children and adolescents. Specifically, the study was designed to assess change in the frequency of nighttime wetting produced by either conditioning treatment with a urine alarm or pharmacotherapy with imipramine hydrochloride. The project also examined the effect of treatment method and outcome on subjects' level of emotional and behavioral adjustment. An attempt was made to identify pre-treatment predictors of treatment outcome and premature withdrawal from treatment.

Statistical Description of the Sample

A total of 49 boys and girls, ages 6 through 16, were enrolled in the treatment program. Subjects were selected from a pool of 148 children of parents who inquired about the program. A breakdown by age, race, and sex of all inquiries and subjects formally admitted to the study appears in Table 1.

Table 1. Demographic data for inquiry pool and study sample.

	Inquiry Pool		Study Sample	
	Number	% of Total	Number	% of Total
<u>AGE</u>				
≤ 5	16†	11	0	0
6	20	14	11	22
7	16	11	4	8
8	18	12	4	8
9	20	14	9	19
10	15	10	6	12
11	15	10	9	19
12	5	3	1	2
13	9	6	2	4
14	6	4	2	4
15	3	2	0	0
16	3	2	1	2
≥17	2‡	1	0	0
Total	148	100	49	100
<u>RACE</u>				
Black	30	20	11	22
White	114	77	37	76
Hispanic	4	3	1	2
<u>SEX</u>				
Male	96	65	40	82
Female	52	35	9	18

†Age 2 1/2 = 1; Age 3 = 1; Age 4 = 3; Age 5 = 11.

‡Age 17 = 1; Age 25 = 1.

The age data reported for the inquiry pool concur with data presented by Oppel, Harper, and Rider (1968b) which indicate that the incidence of enuresis decreases with increasing age. There is a noticeable lack of children under six years of age in the inquiry pool. This is due to the fact that no attempt was made to recruit children in this age group since the minimum age for participation in the study was six. However, certain advertising sources were unable to provide sufficient space in which admission criteria could be explained. Parents of children under six years of age did inquire about the program and were then informed that their child did not meet the age criterion.

The study sample includes individuals recruited from both clinic and non-clinic sources. Clinic subjects were referred to the study through the Department of Pediatrics at Shands Teaching Hospital in Gainesville, Florida, private physicians in the Gainesville area, and the public health departments of Alachua and Levy Counties in North Central Florida. Non-clinic children were recruited using a variety of means, such as advertisements in newspapers, notices on local television stations, and contacts with school personnel. Table 2 provides a detailed breakdown for sources of referral on all inquiries and subjects formally enrolled in the program.

From the pool of 148 inquiries, 99 children did not participate in the program for one reason or another. There were ten children who were scheduled for an initial

Table 2. Description of referral sources for inquiry pool and study sample.

Referral Source	Inquiry Pool		Study Sample .	
	Number	% of Total	Number	% of Total
CLINIC				
Department of Pediatrics	18	12	8	17
Public Health Department	11	7	3	6
Private Physicians	3	2	1	2
NON-CLINIC				
Newspaper	83	56	27	55
Television	10	7	3	6
Schools	15	10	6	12
Miscellaneous	8†	6	1‡	2
TOTAL	148	100	49	100

†Friends = 4; Mental Health Agency = 1, Another Research Project = 3.

‡Friends = 1.

clinic visit but became dry prior to the appointment. It would appear that with certain children the threat of a clinic visit is a sufficient contingency for resolving the problem.

Of the remaining 89 children who did not participate in the program, 51 did not meet various criteria of the program. Table 3 provides a detailed breakdown of the reasons these children were disqualified from the study.

The remainder of the children in the inquiry pool did meet project criteria but were not enrolled in the program for various reasons listed in Table 4.

Pre-Treatment Assessment

Table 5 provides a summary of mean pre-treatment scores for all measures of psychological and behavioral adjustment. The table also includes the mean score for the initial assessment of verbal intelligence. It is apparent that all scores are within normal limits for measures which provide normative data. Only the adjustment subscale of the Personality Inventory for Children approaches the cut-off score for maladjustment.

Table 3. Reasons for disqualification from participation in the study.

Reason	Number	% of Total
Age	18	35
Low wetting frequency	8	16
Secondary enuresis	3	6
Diurnal enuresis	11	21
Seizure disorder	3	6
Recent exposure to one of treatments	6	12
Insufficient IQ	2	4
TOTAL	51	100

Table 4. Reasons for parents decision to not participate.

Reason	Number	% of Total
Expense, time, travel	5	13
Randomization procedure	4	11
Sought alternative treatment	2	5
Family problems	2	5
Child not interested	1	3
Insufficient baseline data	2	5
No explanation	22	58
TOTAL	38	100

Table 5. Mean pre-treatment scores for psychological and behavioral variables for study sample (n = 48 unless otherwise noted).

Measure	Mean Score	Normal Range for Measure
Peabody Picture Vocabulary Test	103	$\bar{x}$ = 100
Piers-Harris Children's Self-Concept Scale	58.56	46-60
What I Think and Feel - Anxiety	11.06	$\bar{x}$ = 13.84 S.D. = 5.79
What I Think and Feel - Lie	4.23	$\bar{x}$ = 3.56 S.D. = 2.37
Nuisance Scale for Enuresis†	16.61	N.A.
Tolerance Scale for Enuresis†	2.054	Range 1.25-3.425‡
Behavior Problem Checklist†	12.92	N.A.
Personality Inventory for Children†*		
Lie	47.96	≤ 59
F scale	54.52	≤ 109
Defensiveness	46.02	≤ 69
Adjustment	58.75	≤ 59
Depression	52.04	< 70
Family Relations	55.46	< 60
Delinquency	58.67	< 80
Withdrawal	54.23	< 70
Anxiety	52.29	< 70
Hyperactivity	52.98	< 60
Social Skills	53.69	< 70
Achievement	52.79	< 60
Intellectual Screening	52.08	< 70
Development	52.73	< 60
Somatic Concern	55.19	< 70
Psychosis	57.06	< 80

† n = 49

‡ Scores obtained for 134 mothers of enuretic children (Morgan & Young, 1975).

* All Personality Inventory for Children scores stated as T-scores. Normal ranges for PIC taken from Wirt et al. (1977).

Results

HO₁ There is no significant difference in treatment outcome for subjects given conditioning treatment, pharmacotherapy with imipramine hydrochloride, or assignment to a clinical waiting list.

The effectiveness of treatment was assessed across treatment groups by weeks. The first week that was used in the analysis was the seven days of baseline prior to the initial clinic visit. Comparisons between groups were then made on a weekly basis through the fourteenth week of treatment, the point at which medication was first terminated.

Nonparametric procedures were used in the data analysis since the distribution of wetting frequency data did not meet the assumption of normality in the conditioning group. An overall test for significance by week was conducted using the Kruskal-Wallis one-way analysis of variance by ranks (Siegel, 1956). With a pre-determined significance level of .05, analysis of the data revealed significant differences among the three groups at weeks 2 through 14 (see Table 6). Thus, Hypothesis 1 was rejected.

For weeks in which an overall significant difference was found, data were reanalyzed using a Wilcoxon rank-sum test to locate the source of the difference. Comparisons

Table 6. Overall differences in wetting frequency for conditioning, pharmacotherapy, and waiting list assignment.

Week of Treat- ment	Treatment Method Wetting Percentages			Prob. > Chi- Square
	Conditioning	Pharmaco- therapy	Waiting List	
Baseline	75.00	77.33	64.33	.2845
1	51.08	44.00	63.08	.2541
2	31.00	42.67	61.92	.0404
3	34.50	40.42	70.17	.0084
4	35.75	36.92	60.58	.0387
5	20.25	45.17	58.33	.0068
6	19.00	32.17	69.17	.0011
7	10.75	35.75	58.33	.0005
8	7.17	42.83	54.67	.0015
9	14.42	36.92	61.92	.0049
10	10.67	39.33	59.42	.0007
11	7.17	42.92	66.67	.0002
12	8.42	44.00	66.42	.0001
13	10.67	47.58	62.00	.0018
14	8.25	39.25	60.83	.0003

were done between: conditioning and waiting list; medication and waiting list; conditioning and medication.

Conditioning treatment was found to be significantly more effective than assignment to a waiting list for each week of treatment following week one. Table 7 contains Chi-square values and significance levels found for each week, including the seven days of baseline.

Using a pre-determined significance level of .05, reanalysis of the data for the medication treatment revealed that the method was significantly better than assignment to a clinical waiting list for the third, sixth, and seventh weeks of treatment. Table 8 provides Chi-square values and significance levels for each week of treatment from weeks 2 through 14.

The third comparison, conditioning and medication, was also performed at a pre-determined significance level of .05. The conditioning approach was found to be significantly better than pharmacotherapy for week 5 and weeks 7 through 14. Table 9 contains the relevant Chi-square values and significance levels.

Additional evidence supporting the superiority of the conditioning approach comes from the number of subjects in each treatment group who attained cure criterion during the study period. Of the 12 children who completed the conditioning program, 10 (83%) reached the cure criterion of 14 consecutive dry nights. By contrast, 4 of the 12 (33%)

Table 7. Comparison of treatment outcome for conditioning
vs. waiting list control

Week	Chi-Square Value	Prob. > Chi-Square
2	6.90	.0086
3	8.17	.0043
4	6.45	.0111
5	9.01	.0027
6	11.80	.0006
7	12.00	.0005
8	9.01	.0027
9	8.84	.0029
10	12.40	.0004
11	16.80	.0001
12	16.80	.0001
13	10.83	.0010
14	14.52	.0001

Table 8. Comparison of treatment outcome for pharmacotherapy vs. waiting list control.

Week	Chi-square Value	Prob. > Chi Square
2	2.00	.1572
3	5.74	.0166
4	3.41	.0647
5	1.20	.2727
6	7.36	.0067
7	3.97	.0464
8	0.85	.3556
9	2.52	.1124
10	2.90	.0885
11	2.61	.1060
12	2.61	.1060
13	1.08	.2987
14	2.80	.0941

Table 9. Comparison of treatment outcome for conditioning and pharmacotherapy.

Week	Chi-square Value	Prob. > Chi-square
1	0.65	.4189
3	0.24	.6236
4	.012	.7920
5	4.56	.0327
6	.096	.3263
7	6.75	.0094
8	9.72	.0018
9	4.56	.0327
10	6.60	.0102
11	5.88	.0153
12	6.90	.0086
13	6.90	.0086
14	7.21	.0073

children who completed the 14 weeks of medication treatment attained cure criterion. Both treatments had more "cures" than the waiting list group where one (8%) child reached the criterion.

Relapse data were collected for each subject in the conditioning and medication groups for a time period varying from 9 to 167 days following termination of treatment. This information was recorded through continued use of the wetting frequency calendars (see Appendix E) utilized during the treatment phase of the study. For parents unwilling to cooperate with this practice, follow-up contact by telephone was made at various points to assess whether a child had maintained nighttime continence. Relapse data were not collected for subjects who opted to use the other treatment program following the initial 14-week period.

The data indicate that 100% of the children (four) who attained cure criterion with the use of pharmacotherapy began wetting again. Relapse was also a problem for subjects who received the conditioning treatment. A total of 5 of the 10 successful conditioning cases eventually resumed wetting. The one subject in the waiting list group who had reached cure criterion resumed nighttime wetting prior to the completion of the waiting list period.

When each of the relapse cases in the conditioning and pharmacotherapy groups was compared with its baseline wetting frequency, it was found that 2 (40%) of the 5 conditioning

relapse subjects were wetting at or above their pre-treatment level. In the pharmacotherapy group, 3 (75%) of the 4 relapse cases were wetting at or above their baseline level. In addition, the mean time period between termination of treatment and attainment of relapse criterion differed for the two groups. Subjects in the conditioning group reached relapse criterion in an average of 37.8 days (range = 25-44). The mean time period for medication subjects was 17 days (range 3-27). Relapse data for individual subjects are provided in Appendix G.

HO₂ There is no significant difference in emotional and behavioral adjustment for children cured of primary nocturnal enuresis as compared with children for whom enuretic symptoms remain.

The repeated measures multivariate procedure used in the analysis of subjects' emotional and behavioral adjustment included two between subject factors (Treatment = Conditioning vs. Pharmacotherapy vs. Waiting List; Outcome = Cured vs. Not Cured) and one within subject factor (Time = Pretest vs. Posttest). A separate MANOVA was computed for each of the following groups of variables: child self-report data, parent ratings of each child on eight subscales of the Personality Inventory for Children, and parent ratings of each subject on five dimensions of the Behavior Problem

Checklist. The data used in the analyses were obtained from the 36 subjects who completed all aspects of their assigned treatment program. Appendix H provides a summary of mean scores for each of the three treatment conditions on the 15 variables related to subjects' emotional and behavioral adjustment. Appendix I summarizes mean scores for the same variables relative to whether cure criterion was or was not attained.

Analysis of the data did not provide support for an effect of treatment outcome on subjects' emotional and behavioral adjustment. From a possible total of 95 significant relationships, only four were identified. Thus, Hypothesis 2 was not rejected.

A significant two-way interaction (Treatment X Outcome) was found for the hyperactivity subscale of the Personality Inventory for Children ($F = 3.29$, $df = 2$, $p = .05$). Analysis of the interaction revealed a significant effect for Outcome for subjects who recieved conditioning ($F = 6.53$, $df = 1$, $p = .02$) and assignment to a clinical waiting list ($F = .14$, $df = 1$, $p = .71$). Table 10 provides a summary of mean scores obtained for each group; higher scores reflect a greater problem with hyperactivity. The meaning of the waiting list interaction is questionable. Only one waiting list subject actually reached cure criterion and it was not possible to obtain post-treatment data before the child began wetting again. As a result, the responses given by

Table 10. Mean scores for the hyperactivity subscale of the Personality Inventory for Children.

Treatment Method	Outcome	
	Cured	Not Cured
Conditioning	58.60	74.50
Pharmacotherapy	47.88	46.19
Waiting List	65.00	52.19

this child were actually given following an extended period of incontinence.

Using a pre-determined significance level of .05 with the remainder of the data, a significant effect for Time was found with the Piers-Harris Children's Self-Concept Scale ($F = 4.10$, $df = 1$, $p = .05$), the anxiety subscale of What I Think and Feel ($F = 4.34$, $df = 1$, $p = .05$), and the anxiety subscale of the Personality Inventory of Children ($F = 4.37$, $df = 1$, $p = .05$). There was an overall improvement for scores on the three measures between administration of pre- and post-assessment. Appendices H and I provide mean pre- and post-test scores plus difference scores for all variables relative to treatment condition and treatment outcome.

Although attainment of cure criterion produced no significant overall change in subjects' level of emotional and behavioral adjustment, it was hypothesized that a clinically significant reduction in wetting frequency might result in such change. Therefore, the factor Outcome was redefined as the subjects' wetting frequency during week #14, the final week of treatment (0% Wetting vs. $\leq$ 50% of Baseline vs. $>$ 50% of Baseline). Analyses were conducted in an identical manner to those done for the two level classification of Outcome (Cured vs. Not Cured).

Using a predetermined significance level of .05, no significant interactions were found using the new definition of Outcome. Main effects for Time were identified for the Piers-Harris Children's Self-Concept Scale ($F = 5.59$, $df = 1$, $p = .03$), the anxiety subscale of What I Think and Feel ($F = 5.52$, $df = 1$, $p = .03$), and the hyperactivity subscale of the Personality Inventory for Children ($F = 5.52$, $df = 1$, $p = .03$). As was the case with the first classification of Outcome (Cured vs. Not Cured) there was an overall improvement for scores on the Piers-Harris and What I Think and Feel. However, parents generally described their children as becoming more hyperactive by the fourteenth week of treatment. Appendix J provides a summary of pre- and post-treatment scores on all variables relative to change in wetting frequency during the final week of treatment.

Analysis of This Week data also failed to provide evidence for a relationship between change in wetting frequency and level of emotional and behavioral adjustment.

Spearman rank order correlation coefficients (Siegel, 1956) were computed using wetting frequency data and This Week results for 40 children who participated in the study. The Spearman coefficient was selected because of the ordinal nature of the scale used in This Week. Data on all variables were available for the week of baseline and 14 weeks of treatment for 35 of the 40 children used in the analysis. The remaining five children provided information for a minimum of 7 to a maximum of 14 weeks (7, 9, 13, 14, and 14 weeks).

Since This Week was developed for this study and used on a pilot basis, a significance level of .10 was chosen for the analysis. A total of five coefficients were computed for each subject: the correlation of wetting frequency with This Week total score, and frequency with each of the four individual item scores on the inventory. Analysis indicated that at least one of these coefficients was significant for 16 of the 40 children (see Appendix K for a summary of within-subject correlations).

There were 35 significant correlations from a possible total of 200, better than one would expect by chance but insufficient for rejection of Hypothesis 2. Using a significance level of .10, there were no children with significant correlations for all five This Week scores, 4 with significant correlations for four scores, 2 children with three scores, 4 with two scores, and 6 children with significant correlations for one score.

Significant correlations were most often found with item #2 (9) and item #4 (9), statements related to how subjects believed significant others reacted to them. There were eight significant correlations for This Week total score, six for item #3, and four for item #1. Table 11 indicates that the majority of correlations were in the expected direction, lower wetting frequency is associated with higher scores on This Week.

The average age for children with significant correlations was 9.4 (range = 6-16) and the mean age for those without significant relationships was 9.3 (range = 6-14). The average IQ was also comparable between groups: 106 (range = 73-140) for those with significant correlations and 104 (range = 77-126) for children without significant correlations. Table 12 provides a breakdown by treatment group of the number of subjects who did and did not have This Week scores which correlated significantly with wetting frequency. There was some difference relative to sex for the two groups: the no-correlation group contained 91% males while the correlation group had only 75% males.

Changes in parent attitudes toward bedwetting were analyzed in a manner identical to that used with variables pertaining to subjects' emotional and behavioral adjustment. The multivariate procedure involved the use of two between subject factors (Treatment = Conditioning vs. Pharmacotherapy vs. Waiting List; Outcome - Cured vs. Not Cured) and one within subject factor (Time = Pretest vs. Posttest).

Table 11. Direction of within-subject correlations between wetting frequency and This Week responses.†

Response Number	Direction of Correlation		
	(-)	(+)	1.00
Total Score	29	6	3
#1	26	6	6
#2	26	9	3
#3	21	13	4
#4	21	14	3

†Computed using Spearman's rank order correlation coefficient.

Table 12. Number of subjects with significant correlations between This Week scores and wetting frequency.

Treatment Group	Subjects With Correlations	Subjects Without Correlations
Conditioning	6	6
Pharmacotherapy	5	9
Waiting List	5	7

The analysis used the data provided by the 36 subjects who completed all aspects of their treatment program.

Using a predetermined significance level of .05, analysis of the data revealed a significant three-way interaction (Treatment X Outcome X Time) for the Tolerance Scale for Enuresis ($F = 6.78$, $df = 2$, $p = .004$). Reanalysis of this interaction revealed no significant differences for conditioning and pharmacotherapy but a highly significant two-way interaction (Outcome X Time) for the waiting list control condition ($F = 21.92$, $df = 1$, $p = .0009$). It was then found that no significant difference existed for Outcome at the pre-treatment level, but a significant difference for Outcome did exist at the post-treatment level ($F = 584$, $df = 1$, $p = .04$).

Subjects who did attain cure criterion had significantly higher scores ($\bar{x} = 3.25$) than subjects who were not cured ($\bar{x} = 2.07$). This would mean that parents of children who attained the cure criterion of 14 consecutive dry nights during their participation on a clinical waiting list had a less tolerant attitude toward bedwetting than did parents of children who had not reached criterion. However, one must be cautious about the interpretation of these results since the waiting list subject who attained cure criterion relapsed and actually completed post-treatment measures following an extended period of incontinence.

HO₃ There is no significant difference in the emotional and behavioral adjustment of children as a result of the method of treatment received for primary nocturnal enuresis.

The repeated measures multivariate procedure used to analyze Hypothesis 2 also provided the results for the effect of treatment method. The analysis involved two between subject factors (Treatment = Conditioning vs. Pharmacotherapy vs. Waiting List; Outcome = Cured vs. Not Cured) and one within subject factor (Time = Pretest vs. Posttest). Analysis revealed only the two significant interactions reported and interpreted for Hypothesis 2: a three-way interaction (Treatment X Outcome X Time) for the Tolerance Scale for Enuresis ($F = 6.78$, $df = 2$, $p = .004$)

and a two-way interaction (Treatment X Outcome) for the hyperactivity subscale of the Personality Inventory for Children ($F = 3.29$, $df = 2$, $p = .05$). Data were also analyzed using the three level classification for Outcome (0% Wetting vs. $\leq 50\%$ of Baseline vs. $> 50\%$ of Baseline). Analyses revealed no significant differences in adjustment due to treatment method. Thus, Hypothesis 3 was not rejected.

Although the results were not significant, there was a trend suggesting a psychotropic effect from imipramine hydrochloride. A review of Appendix H reveals more improvement on emotional and behavioral variables for pharmacotherapy subjects (14 of 17 variables) than for either conditioning subjects (11 of 17) or children assigned to a clinical waiting list (3 of 17). This is particularly notable since more conditioning subjects (83%) than pharmacotherapy subjects (33%) attained the cure criterion of 14 consecutive dry nights.

HO₄ There is no pre-treatment variable which can predict the outcome of treatment for primary nocturnal enuresis.

A multivariate analysis was conducted using one between subject factor (Outcome = Cured vs. Not Cured). The data used in the analysis were those obtained from the 36 subjects who completed all aspects of their assigned treatment program. Only pretest scores were used in the analysis. A total of

26 variables were examined, the 17 variables relating to subjects' emotional and behavioral adjustment plus the IQ score obtained from the Peabody Picture Vocabulary Test and eight additional scores for Personality Inventory for Children subscales (Lie, F, Defensiveness, Achievement, Intellectual Screening, Development, Somatic Concern, and Psychosis). Only the Personality Problem subscale of the Behavior Problem Checklist was a significant predictor of treatment outcome ($F = 4.47$, $df = 1$, $p = .04$). Parents of subjects who reached cure criterion endorsed fewer Personality Problem items ($\bar{x} = 2.20$) than did parents of children who were not dry for 14 consecutive nights ($\bar{x} = 4.14$).

These results are not impressive since they are no better than one might expect to find on the basis of chance given a predetermined significance level of .05. In addition, further analysis of the data using the three-level classification of Outcome (0% Wetting vs. $\leq 50\%$ of Baseline vs. $> 50\%$ of Baseline) revealed no significant predictor of wetting frequency during the final week of treatment. Thus, Hypothesis 4 was not rejected.

HO₅ There is no pretreatment variable which can predict premature withdrawal from treatment for primary nocturnal enuresis.

Variables that might predict early withdrawal from treatment were analyzed using the entire treatment sample of 49 subjects. Premature withdrawal was analyzed for

conditioning and pharmacotherapy subjects as well as those children assigned to the clinical waiting list. Using a predetermined significance level of .05, none of the variables relating to subjects emotional and behavioral adjustment were found to predict premature withdrawal. However, multivariate analysis using one between group factor (Group = In vs. Out) indicated that the Tolerance Scale for Enuresis was a highly significant predictor of early withdrawal from treatment ($p = .007$). Since Morgan and Young (1975) had presented evidence supporting the use of the Tolerance Scale with conditioning subjects, individual t -tests were run for subjects in each of the three treatment groups. The Morgan and Young (1975) results were replicated. The Scale was found to significantly predict premature withdrawal from conditioning treatment ($T = 4.72$, $df = 13$, $p = .004$), but not early termination from pharmacotherapy ($T = 1.16$, $df = 14$, $p = .26$) or waiting list ($T = 0.84$, $df = 15$, $p = .41$). Since the Scale was a significant predictor for only one of the three treatment conditions, Hypothesis 5 was not rejected.

CHAPTER V
SUMMARY, CONCLUSIONS AND
RECOMMENDATIONS FOR FURTHER RESEARCH

Summary

Many studies have been conducted to investigate the effectiveness of either conditioning treatment with a urine alarm or pharmacotherapy with imipramine hydrochloride for the control of primary nocturnal enuresis. Only one study (Kolvin et al., 1972) involved a direct comparison of these two approaches. The total treatment period in the Kolvin et al. (1972) program was eight weeks, six weeks less than the present study. In addition, no control group was used in the Kolvin et al. (1972) study and the treatment groups were comprised of medication, placebo, and conditioning.

The present study included the use of a waiting list control group plus a longer treatment period than did the Kolvin et al. (1972) study. This project was designed to be a direct comparison of conditioning treatment with a urine alarm and pharmacotherapy with imipramine hydrochloride. The study was also designed to examine the effect of treatment method and outcome on an enuretic child's emotional and behavioral adjustment.

Analysis of subjects' wetting frequency over the course of treatment revealed a significantly more effective outcome

for the conditioning approach as compared with either pharmacotherapy or assignment to a clinical waiting list. Consistent with the findings of others (Shaffer, 1973; Tapia et al., 1960; Kolvin et al., 1972; Sacks et al., 1974), the subjects in this study scored within normal range on pre-treatment measures of emotional and behavioral adjustment. Comparisons of pre- and post-treatment measures of adjustment provided insufficient evidence to support the hypotheses that either change in the frequency of nighttime wetting or the method of treatment received would significantly influence subjects' level of emotional and behavioral adjustment. In addition, only one of 26 pre-treatment variables was found to significantly predict treatment outcome. The only pre-treatment predictor of premature withdrawal from treatment was the Tolerance Scale for Enuresis (Morgan & Young, 1975) which was found to be a highly significant predictor of early termination from conditioning treatment.

Discussion

HO₁ There is no significant difference in treatment outcome for subjects given conditioning treatment, pharmacotherapy with imipramine hydrochloride, or assignment to a clinical waiting list.

Since highly significant differences were found between treatment mode and outcome, Hypothesis 1 was rejected. The success rate of 83% found for conditioning supports the conclusions of Johnson (1980) and Perlmutter (1978) that one can expect to achieve an initial mean cure level of 80% using this method. It is difficult to compare the present findings with outcome data reported by Kolvin et al. (1972) since current findings are reported on a weekly basis while those of Kolvin et al. (1972) were presented in terms of mean wet nights per month. However, the reductions in wetting frequency found in this study resemble the results reported by Kolvin et al. (1972) at the 4-week point in treatment. At the 8-week point the similarity disappears. Kolvin et al. (1972) found continued reduction in wetting frequency for both treatment methods. In the present study there were dramatic differences, with a slight increase in frequency for subjects receiving medication, but a drastic reduction for conditioning subjects.

These conflicting results may be due in part to the different nature of the study samples. Kolvin et al. (1972) treated only those children who were between the ages of eight and ten. Their sample contained a higher percentage of females (40%) than did the present study and included children who exhibited secondary nocturnal enuresis (22%). Kolvin et al. (1972) provide no detailed description of their treatment methods. No mention is made of the

procedures used in the conditioning program and the authors do not describe the dosage level of imipramine hydrochloride prescribed for pharmacotherapy subjects. Without this information it is extremely difficult to explain the conflicting outcome data reported by Kolvin et al. (1972) and the present study.

Post-treatment wetting data obtained for conditioning subjects in this study provide support for previous reports of relapse as summarized by Johnson (1980). In the present study the high relapse rates for conditioning may be due, in part, to the fact that a straight conditioning format was utilized without the use of relapse prevention measures such as overlearning (Taylor & Turner, 1975; Young & Morgan, 1972). Relapse was also a problem for pharmacotherapy subjects in the present study. Relapse occurred in all four of the cases cured with the use of imipramine hydrochloride. These data support previous findings reported by MacLean (1960), Margolis (1962), Mariuz and Walters (1963), Thomson et al. (1967), and Treffert (1964).

HO₂ There is no significant difference in emotional and behavioral adjustment for children cured of primary nocturnal enuresis as compared with children for whom enuretic symptoms remain.

Only 8 of the possible 204 relationships for emotional and behavioral variables were found to be significant. Thus, Hypothesis 2 was not rejected.

Aside from the two significant interactions found in the present study, all six main effects were for time, the difference in scores between pre- and post-assessment. These results are consistent with those reported by Sacks et al. (1974) who found time to be the significant factor in explaining decline in psychological symptoms between pre-treatment and follow-up assessments. The decline reported by Sacks et al. (1974) occurred irrespective of treatment mode or outcome, results supported by present findings.

Baker (1969, p. 46) stated that "the most frequently reported observation of parents was the child's happiness at becoming dry." Although no formal measure of this factor was utilized in the present study, children who attained cure criterion did appear to be satisfied with their accomplishment. The present study did not provide supportive evidence for a significant improvement in psychological variables relative to treatment outcome as was reported by Baker (1969). The decline in anxiety level found in the present study was significant for self- and parent-report measures across all treatments and outcomes, unlike the Baker (1969) study which reported a significant relationship between anxiety reduction and successful treatment outcome.

These conflicting results may be due to the manner in which comparisons were made for psychological variables. Unlike the present study which compared cured and uncured enuretics, Baker (1969) compared cured enuretics with non-enuretic controls. More importantly, Baker (1969) administered the post-treatment assessment at a standard point, ten weeks after the initiation of treatment. There was also a follow-up evaluation conducted 12 weeks following the post-assessment. It was at the follow-up assessment, 22 weeks after the initiation of treatment, that Baker (1969) found significant differences in subjects' self-report of anxiety and self-image. The present study collected post-treatment data for cured enuretics immediately following the attainment of 14 consecutive dry nights. The extreme variance in the length of the post-treatment assessment period may have contributed to the difference in psychological outcome data reported by Baker (1969) and the present study.

HO₃ There is no significant difference in the emotional and behavioral adjustment of children as a result of the method of treatment received for primary nocturnal enuresis.

The present study did not find evidence to support the Werry et al. (1975) hypothesis of a psychotropic effect for imipramine hydrochloride. In the present study, subjects who received pharmacotherapy did show improvement on 14 of

the 17 variables relating to psychological and behavioral adjustment. This compares with a mean improvement on 11 variables for conditioning subjects and three variables for children on the clinical waiting list. Although treatment successes with the conditioning approach far out-number those found with pharmacotherapy, none of the above results for emotional and behavioral adjustment were significant.

Specifically, Werry et al. (1975) reported significantly fewer conduct problems for children receiving imipramine hydrochloride than for subjects receiving a placebo. The authors reported that subjects receiving the medication had a significantly greater incidence of sedation or slowing of behavior, gastrointestinal disturbances, plus a more cooperative and happier attitude toward life situations. Although the present study offers no empirical data to support these findings, anecdotal evidence obtained from parents of children receiving imipramine hydrochloride indicated fewer problems with behavior management for two subjects, gastrointestinal disturbances for two subjects, and significant weight loss (110 to 91 lbs.) for one child.

The lack of empirical support may be due to certain differences in treatment procedure followed in the present study. Pharmacotherapy subjects in the Werry et al. (1975) study received imipramine hydrochloride for only three weeks, 11 weeks less than subjects involved in the present study. In addition, all Werry et al. (1975) subjects received a

single daily dose of 50 mg. of the medication following an initial three-day period of 25 mg. when side effects were assessed. Dosage in the present study varied among subjects according to their age and body weight. The fact that Werry et al. (1975) treated children who were 5-11 years old is significant since younger subjects would have received a dosage level twice that of younger children treated in the present study. This difference could account for some of the inconsistencies with the findings.

Problems also exist in the manner in which Werry et al. (1975) assessed change in psychological and behavioral variables. The significant differences found for parent-report data on subjects' conduct problems was not a measure of change over the course of treatment. Pre-test scores on this variable were dropped and comparisons were actually made between post-test scores for imipramine and placebo subjects. No mention was made regarding initial differences between the two groups. Werry et al. (1975) also found a significant difference in clinical global impression for imipramine and placebo subjects. The flaw with this finding was that evaluations were made by the primary investigator who apparently was not blind to subjects' treatment condition or outcome.

Both the method of assessing change secondary to treatment and the type of treatment format used by Werry et al. (1975) could account for the significant results

obtained in support of a psychotropic effect for imipramine hydrochloride. Although the present study did not obtain significant differences that would replicate the findings of Werry et al. (1975), the data do show a trend that is consistent with the authors' findings. Due to methodological limitations in both studies, the possibility of a psychotropic effect from imipramine hydrochloride remains an open question.

HO₄ There are no pre-treatment variables which can predict the outcome of treatment for primary nocturnal enuresis.

Of the 26 pre-treatment variables analyzed, only the Personality Problem subscale of the Behavior Problem Checklist was a significant predictor of whether or not a child would attain the cure criterion of 14 consecutive dry nights. This would appear to suggest that children who are seen by their parents as less withdrawn and more socially adequate stand a better chance of achieving nighttime continence. If this were the case, one would expect to find other significant predictors of outcome, such as the Anxiety, Withdrawal, or Social Skills subscales of the Personality Inventory for Children. One might also anticipate child self-report data to be significant on the Piers-Harris Children's Self-Concept Scale or the anxiety subscale of What I Think and Feel. The fact that such supporting data

are not available strengthens the contention that the statistical significance attributed to the Personality Problem subscale in this study is a chance finding.

HO₅ There is no pre-treatment variable which can predict premature withdrawal from treatment for primary nocturnal enuresis.

No pre-treatment variable used in the present study was a valid predictor of premature withdrawal from all three treatment conditions. However, the present study did replicate the findings of Morgan and Young (1975) regarding the use of the authors' Tolerance Scale for Enuresis as a predictor of premature withdrawal from conditioning treatment for nocturnal enuresis. The Tolerance Scale was the only pre-treatment measure used in the present study which did significantly predict early withdrawal from conditioning treatment. It appears that the scale is a valuable tool in the treatment of nocturnal enuresis, since elevated scores could alert the clinician to the possibility of early termination from treatment.

It is interesting to note that the instrument was not a valid predictor of premature withdrawal from pharmacotherapy or participation on a clinical waiting list. This may be due to the amount of time and energy required of parents whose children received conditioning treatment.

Parents of conditioning subjects were asked to supervise their child during the early stages of treatment and to bring their child to weekly clinic appointments. Considerably lighter demands were placed on the parents of pharmacotherapy and waiting list subjects. This could mean that the Tolerance Scale is an indirect measure of a parent's willingness to cooperate with conditioning treatment guidelines. The data obtained in the present study support earlier reports that lack of parent cooperation frequently leads to early termination from conditioning treatment (Forsythe & Redmond, 1970; Geppert, 1953; Turner et al., 1970; Young, 1965).

Limitations

The present study has several limitations. First, the sample size is small. This factor becomes particularly important when one is examining the relationship between treatment method and outcome with variables related to psychological and behavioral adjustment. Although 16 subjects were initially assigned to each treatment group, only 12 children completed each of the treatments. It is possible that within-group variability has eliminated the opportunity to find significant relationships although differences may exist in regard to the effect of treatment method or outcome on psychological and behavioral adjustment.

Another limitation of the present study is the This Week inventory used in the program. This questionnaire was designed to identify weekly changes in self-identity that might result from alterations in wetting frequency. Although the inventory was given some testing prior to use in the study, there were limited data available regarding the validity and reliability of the instrument. Despite these limitations, This Week was included in the present study since no other quick and easy measure could be found to assess weekly change in a child's rating of self. Given the pilot nature of This Week, it is possible that instrument error prohibited the detection of actual change. It is also possible that the concept of a child realistically evaluating the previous week may be an erroneous one. The responses children gave to This Week may be more reflective of what happened to them on this day, or during this hour, or during the past minute.

The present study was designed to examine the effectiveness of the two most commonly used treatments for primary nocturnal enuresis as they are practiced at Shands Teaching Hospital, Gainesville, Florida. It is possible that variability exists within treatment mode and that the manner in which the programs are administered at Shands is not identical to the way the treatments are offered elsewhere. This is particularly true of the conditioning program. It is standard procedure at Shands to utilize a reward system with

children who receive conditioning treatment. Although the use of rewards is commonplace in behavioral treatment with children, the results reported here may not compare with those obtained using a conditioning program that does not incorporate a reward system.

Finally, the administration of post-treatment measures immediately following attainment of cure criterion may not provide sufficient time for a child to experience changes in psychological and behavioral adjustment relative to the elimination of nighttime wetting. It is entirely possible that a child who has been dry for 14 consecutive nights may still have the identity of "bedwetter," a self-image that could take a much longer period of time to extinguish. A limiting factor in the present study is the fact that subjects' level of self-esteem was basically normal prior to the initiation of treatment. One is left with the question of how "normal" an individual can be. It is possible that no significant improvement in self-esteem can occur for the enuretic child who has a satisfactory self-identity.

Conclusions

The conclusions of this study, simply stated, are

- 1) Conditioning treatment with a urine alarm was found to be superior in the treatment of primary nocturnal enuresis when compared with

pharmacotherapy with imipramine hydrochloride or assignment to a clinical waiting list.

- 2) Although relapse was found to occur with conditioning treatment and pharmacotherapy, it happened quicker and at a higher rate with children receiving pharmacotherapy.
- 3) There was no significant effect for treatment outcome on a child's level of psychological and behavioral adjustment.
- 4) Although limited side effects were reported, there was no significant psychotropic effect associated with the use of imipramine hydrochloride.
- 5) The Personality Problem subscale of the Behavior Problem Checklist was found to significantly predict attainment of the cure criterion of 14 consecutive dry nights.
- 6) The Tolerance Scale for Enuresis was found to be a valid predictor of premature withdrawal from conditioning treatment.

Recommendations for Further Research

Several recommendations for further research seem warranted. First, attention can be focused on the instruments selected for use in the study. Given the present results suggesting poor test-retest reliability for the

Piers-Harris Children's Self-Concept Scale and What I Think and Feel, an investigator might look elsewhere for assessment tools. This would especially be true for What I Think and Feel which has limited reliability data available. If a weekly measure is desired, one must either conduct a closer evaluation of This Week or select another measure.

Although mean scores on all pre-treatment measures were within normal range, there were individual subjects in the present study whose scores suggested a level of maladjustment. It is possible that some children are more affected by their bedwetting than others. For those children who are minimally influenced by their nocturnal enuresis, one might expect not to find significant changes in psychological and behavioral adjustment following elimination of nighttime wetting. A future study could be conducted in which children with primary nocturnal enuresis receive a pre-assessment but treatment is limited to those children who present initial signs of maladjustment. If the enuresis is the causal factor behind the maladjustment, one would expect to see improvement in psychological and behavioral adjustment following elimination of the wetting.

Given the practical limitations involved in conducting a treatment study such as this, post-assessment is probably best done upon termination of treatment. However, one might extend the cure criterion to 21 or 28 consecutive dry nights in order to increase the impact that success in

treatment might have on the child's self-identity. Another option would be to administer the post-assessment upon termination of treatment and again at a follow-up point 6-12 months later. During this time period records could be kept to check for relapse, a factor which might have an effect on the child's level of adjustment.

Finally, more long-range research could be done which would involve larger numbers of children with primary nocturnal enuresis. More attention could be given to family variables which might influence the maintenance of the behavior. An attempt could be made to assess the function, if any, that enuresis plays within the family system. With larger sample sizes, one will have a greater opportunity to study variables such as these and locate significant relationships where they do exist.

APPENDIX A
INFORMED CONSENT FORM

It is my understanding that the purpose of the present investigation is to compare the success of two commonly used treatment methods for bed-wetting. I have been informed that evidence exists to indicate that both of these methods are effective with some children in reducing or eliminating bed-wetting.

I understand that my child and I will complete various questionnaires at the beginning and at the end of treatment. As part of my participation in this study, I will be asked to contact my child's teacher at the beginning and at the end of treatment and to request him/her to complete a commonly used, behavior rating scale for children. I have been assured that no mention will be made to the teacher of my child's bed-wetting and I have been told that all information I provide during the present study will remain confidential.

I understand that my child will initially be assigned to a 16-week period of either medication treatment or night-time training with a urine alarm. If my child receives night-time training, I understand that I will be expected to attend fifteen weekly sessions at Shands Teaching Hospital or the number of meetings prior to the point at which my child achieves fourteen consecutive dry nights, whichever comes first. Should my child receive medication treatment, I understand that my appointments at Shands will be scheduled on a bi-monthly basis. Regardless of the treatment received, I have been told that I will be asked to record the frequency of my child's wetting for the entire sixteen-week study period.

I have been informed that the medication prescribed in this study is the most commonly used drug for the treatment of bed-wetting. I have also been informed that the use of this drug may result in certain adverse reactions such as nervousness, sleep disorders, tiredness, or mild gastrointestinal disturbances. I have been told that such reactions typically disappear during continued use of the medication or upon adjustment of the dosage level. However, I have been informed that I should contact my physician if my child experiences any of these reactions. I have been told that use of the drug will be discontinued if my child experiences any detrimental effects.

I have been informed that everyone cannot be treated at once and I may need to wait for a period of one week to four months before entering treatment. I have also been informed that if the initial treatment program is unsuccessful following a four-month trial period, the other treatment method will be made available. I have been told that I will receive answers to any questions I may pose regarding the treatment methods used in the present investigation. I understand that I have the right to withdraw my child from this study at any time.

I understand that charges for treatment will be based on my ability to pay and will range from a minimum of \$15 to a maximum of \$150 for the total treatment program.

In the event of my child's sustaining a physical injury which is proximately caused by this experiment, professional medical care received at the J. Hillis Miller Health Center exclusive of hospital expenses will be provided me without charge.

Signed _____

Date _____

APPENDIX B TOLERANCE SCALE FOR ENURESIS

Name of child _____

Below is a list of statements about bedwetting. Please read each one carefully. Put a circle around the word YES if you think it describes your own feelings. Put a circle around the word NO if you think it does not describe your feelings.

- | | |
|---|---------------|
| 1. A child who wets the bed needs help and sympathy. | YES NO (1.15) |
| 2. If only he (she) would grow up a bit we wouldn't have all this trouble with wet beds. | YES NO (3.55) |
| 3. Bedwetting is not really much of a problem. | YES NO (2.25) |
| 4. Children could stop wetting if they tried hard enough. | YES NO (3.90) |
| 5. I have got used to wet beds by now. | YES NO (2.55) |
| 6. I punish my child for wetting the bed. | YES NO (4.15) |
| 7. Bedwetting usually clears up on its own. | YES NO (2.10) |
| 8. My child's bedwetting is a nuisance to the rest of us. | YES NO (3.45) |
| 9. I let him (her) see that I am disappointed when he (she) has wet the bed. | YES NO (3.40) |
| 10. Bedwetting is nothing but a dirty habit. | YES NO (4.25) |
| 11. When my child wets the bed I tell him (her) that it does not matter. | YES NO (1.25) |
| 12. I worry more about my child's happiness than about a few extra sheets to wash. | YES NO (1.10) |
| 13. I try to help him (her) not to be upset by his (her) bedwetting. | YES NO (1.25) |
| 14. It is a pity that bedwetting stops a child from doing so many things. | YES NO (2.30) |
| 15. I feel sorry for any child who wets the bed. | YES NO (1.45) |
| 16. A good smacking never did any bedwetter any harm and may do a lot of good. | YES NO (4.00) |
| 17. I do not mind washing wet sheets because the child can't help it. | YES NO (1.30) |
| 18. I don't see why my child can't be dry when others can. | YES NO (3.50) |
| 19. I try to make my child realize the unpleasantness his (her) bedwetting causes for others. | YES NO (3.60) |
| 20. It is very embarrassing to be a bedwetter. | YES NO (3.10) |

NUISANCE SCALE FOR ENURESIS

Please check off all the items below which you consider worse to deal with than bedwetting whether they have occurred with your own child or not.

- | | |
|--|---|
| stealing (100) | often sick (61) |
| often spiteful and cruel (92) | temper tantrums (60) |
| running away (91) | jealous of others (58) |
| lying (87) | sulkiness (54) |
| deliberately breaks things (86) | sensitive and easily upset (50) |
| always crying and miserable (79) | afraid of the dark (47) |
| playing truant from school (77) | always seems to have aches and pains (47) |
| soils pants (72) | moodiness (47) |
| bullies smaller or younger children (71) | wets pants (34) |
| disobedience (70) | noisy and restless (33) |
| has nightmares (69) | needs a lot of attention (25) |
| sleepwalking (66) | fussiness (18) |
| always fighting (62) | |

APPENDIX C
WHAT I THINK AND FEEL

1. A I have trouble making up my mind.
2. A I get nervous when things do not go the right way for me.
3. A Others seem to do things easier than I can.
4. L I like everyone I know.
5. A Often I have trouble getting my breath.
6. A I worry a lot of the time.
7. A I am afraid of a lot of things.
8. L I am always kind.
9. A I get mad easily.
10. A I worry about what my parents will say to me.
11. A I feel that others do not like the way I do things.
12. L I always have good manners.
13. A It is hard for me to get to sleep at night.
14. A I worry about what other people think about me.
15. A I feel alone even when there are people with me.
16. L I am always good.
17. A Often I feel sick in my stomach.
18. A My feelings get hurt easily.
19. A My hands feel sweaty.
20. L I am always nice to everyone.
21. A I am tired a lot.
22. A I worry a lot about what is going to happen.
23. A Other children are happier than I.
24. L I tell the truth every single time.
25. A I have bad dreams.
26. A My feelings get hurt easily when I am fussed at.
27. A I feel someone will tell me I do things the wrong way.
28. L I never get angry.
29. A I wake up scared some of the time.
30. A I worry when I go to bed at night.
31. A It is hard for me to keep my mind on my schoolwork.
32. L I never say things I shouldn't.
33. A I wiggle in my seat a lot.
34. A I am nervous.
35. A A lot of people are against me.
36. L I never lie.
37. A I often worry about something bad happening to me.

A= Anxiety Scale item

L= Lie Scale item

APPENDIX D
THIS WEEK

To be completed
on Friday

THIS WEEK

CIRCLE THE PICTURE BELOW THAT BEST DESCRIBES THIS WEEK FOR YOU.

	STRONGLY AGREE	AGREE	UNCERTAIN	DISAGREE	STRONGLY DISAGREE
1.) This week I was a happy person.					
2.) This week other people were happy with me.					
3.) This week I was a good person.					
4.) This week other people were good to me.					

APPENDIX E TREATMENT RECORDING CHART

NAME: _____

TREATMENT RECORDING CHART

INSTRUCTIONS:

For each night your child wets the bed, place a "w" in the appropriate box. If your child does not wet the bed, place a "D" in the box provided for that night.

This chart is for the week of _____.

☐	☐	☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

APPENDIX F
THE NIGHTTIME TRAINING APPROACH

The alarm used in this method has been found to be successful in treating bed-wetting for certain children. The apparatus itself is composed of two specifically designed foil pads which are separated by a thin layer of cloth. Individual wires connect each foil pad with a bedside unit which contains both a buzzer and a low-voltage flashlight battery.

* * * * *

The following steps should be taken to increase the effectiveness of the alarm.

- 1) It is necessary that your child's bed be as firm as possible. This may require the use of a "bed board" beneath the mattress.
- 2) It is important that the perforated foil pad be placed on top with the solid pad and cloth layer underneath. Be certain that the cloth layer completely eliminates any direct contact between the foil pads.
- 3) Center the pads in the middle of the mattress in the area where your child is most likely to wet.
- 4) When the wire clips are attached to the foil pads, make certain that the clips are placed at least six inches apart on the side of the pad adjacent to the bed-side unit.
- 5) Cover the pads with a regular flat sheet, it will help to tuck the sheet tightly under the mattress in order to keep the foil pads in place. Do not have your child sleep directly on top of the foil pads.
- 6) It will help if your child sleeps without pajama bottoms and if he/she begins each evening by sleeping face-down on the mattress.

- 7) On a weekly basis it will be necessary to test the strength of the battery in the bedside unit. Do this by turning the switch on the unit to "ON" and then touch the two wire clips together to get a sound.
- 8) Turn on a dim night light each evening in your child's bedroom.

* * * * *

It is desirable for each child to assume as much responsibility as possible for his/her treatment. As a result, your child should be encouraged to do the following each evening before going to bed.

- 1) Make certain that a change of dry sheets is available in the room.
- 2) Make certain that a paper shopping bag is available for the disposal of any wet sheets that might result during the night.
- 3) Check the foil pads to make certain that the pads are completely separated by the cloth layer. Make sure that the wire clips are attached to the pads and are at least six inches apart from each other.
- 4) Carefully place the regular flat sheet on the mattress and tuck it under tightly.
- 5) Switch the buzzer unit to "ON."
- 6) Go to bed and lay face-down on the mattress.

* * * * *

If your child should wet the bed, the following procedure needs to be followed. During the early phases of the treatment program, it will probably be necessary for you to awaken and insure that your child follows the procedure correctly.

- 1) When the alarm sounds, your child must awaken, STAND UP alongside the bed, and turn on a bedside lamp before turning the alarm switch to "OFF."
- 2) Your child will then walk to the bathroom and finish urinating.

- 3) Your child should then go to the lavatory and splash water on his/her face to insure that he/she is actually awake.
- 4) Return to the bedroom, remove the wet sheet from the bed, and place the sheet in the paper bag located nearby.
- 5) Separate the foil pads, remove the wet cloth layer, and place the cloth in the paper bag.
- 6) Take a dry cloth and wipe any moisture from the foil pads.
- 7) Replace the bottom foil pad on the mattress, insert a new layer of dry cloth, and place the perforated foil pad on top. Again it is necessary to insure that the foil pads are not touching each other.
- 8) Attach one wire clip to each pad. Make certain that the two clips are located at least six inches apart.
- 9) Replace a dry flat sheet over the foil pads and tightly tuck it under the mattress.
- 10) Turn the alarm switch to "ON."
- 11) Return to bed and lay face-down on the mattress.

APPENDIX G
RELAPSE DATA FOR SUBJECTS IN THE
CONDITIONING AND PHARMACOTHERAPY GROUPS

Subject Number	Treat- ment	Number of Days in Follow-up Period	Relapse	Number of Days to Relapse	Wetting > Baseline
1	C	130	Yes	37	Yes (7)
7	C	104	No	--	--
13	C	167	No	--	--
16	C	77	Yes	37	No (1)
19	C	83	Yes	25	No (3)
22	C	140	No	--	--
31	C	28	No	--	--
37	C	98	No	--	--
40	C	48	Yes	38	No (2)
46	C	81	Yes	44	Yes (3)
8	M	9	Yes	3	Yes (6)
11	M	126	Yes	27	Yes (4)
23	M	97	Yes	12	No (2)
35	M	37	Yes	26	Yes (4)

APPENDIX H
COMPARISON OF PRE- AND POST-TREATMENT
SCORES ACCORDING TO TREATMENT METHOD (N=36)

Variables†	Conditioning (n=12)			Medication (n=12)			Waiting List (n=12)		
	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff
Piers-Harris	59.75	61.25	+1.50	63.92	68.08	+4.16	54.83	59.42	+4.59
CMAS Anxiety	11.75	8.42	+3.33	9.58	6.42	+3.16	10.83	11.25	-0.42
BPC Total Score	13.58	12.08	+1.50	9.67	7.67	+2.00	17.67	19.82	-2.15
BPC Conduct Problem	6.33	6.67	-0.34	2.83	2.25	+0.50	8.00	8.73	-0.73
BPC Personality Prob.	2.58	2.17	+0.41	3.25	2.58	+0.67	4.17	4.36	-0.19
BPC Inadeq.-Immatur.	1.33	1.25	+0.08	1.25	0.92	+0.33	1.75	2.00	-0.25
BPC Socialized Delin.	0.42	0.25	+0.17	0.00	0.00	0.00	0.17	0.73	-0.56
Enuresis Nuisance	14.50	14.42	-0.08	16.92	17.17	+0.25	16.75	17.92	+1.17
Enuresis Tolerance	1.89	1.90	-0.01	2.04	1.95	-0.09	1.91	2.17	-0.26
PIC Adjustment	62.75	62.83	-0.08	54.75	52.67	+2.08	62.75	65.42	-2.67
PIC Depression	51.67	48.75	+2.92	51.25	47.92	+3.33	56.00	57.75	-1.75
PIC Family	54.00	54.00	0.00	54.83	54.50	+0.33	56.00	54.00	+2.00
PIC Delinquency	58.83	56.50	+2.33	50.83	50.25	+0.58	62.17	67.50	-5.33
PIC Withdrawal	50.00	48.92	+1.08	56.75	53.33	+3.42	56.08	56.42	-0.34
PIC Anxiety	54.50	48.58	+5.92	52.42	49.52	+3.17	54.42	54.92	-0.50
PIC Hyperactivity	58.58	63.92	-5.34	45.08	48.42	-3.34	52.08	54.50	-2.42
PIC Social Skills	54.41	53.67	+0.74	59.83	43.33	+7.50	52.83	55.08	-2.25

†scores adjusted for direction: "+" = improvement and "-" = deterioration relative to the symptom measured.

APPENDIX I
COMPARISON OF PRE- AND POST-TREATMENT SCORES
ACCORDING TO ATTAINMENT OF CURE CRITERION (N = 36)†

Variable‡	Did Not Attain Criterion (n=21) Did Attain Criterion (n=15)			
	Pre-Score	Post-Score	Diff.	Post-Score
Piers-Harris	59.29	62.29	+3.00	59.80
CMAS Anxiety	10.81	9.57	+1.24	10.60
BPC Total Score	15.00	15.70	- .70	11.73
BPC Conduct Problem	5.90	6.25	-1.35	5.47
BPC Personality Problem	1.67	1.70	+0.14	2.20
BPC Inadequacy Immaturity	1.67	1.70	-0.03	1.13
BPC Socialized Delinquency	0.10	0.40	-0.30	0.33
Enuresis Nuisance	15.5	16.2	+0.70	16.8
Enuresis Tolerance	2.018	2.113	-0.095	1.838
PIC Adjustment	62.57	62.90	-0.33	56.60
PIC Depression	54.90	55.33	-0.43	50.27
PIC Family	56.71	54.81	+1.90	52.47
PIC Delinquency	58.90	61.48	-2.48	55.00
PIC Withdrawal	58.10	56.19	+1.91	48.93
PIC Anxiety	54.38	53.90	+0.48	52.93
PIC Hyperactivity	50.05	53.90	-3.85	54.53
PIC Social Skills	54.52	55.24	-0.70	11.73
				63.80
				7.46
				9.40
				5.20
				1.67
				0.93
				0.20
				16.9
				1.858
				56.67
				46.07
				53.27
				53.33
				48.27
				46.73
				57.87
				9.40
				+4.00
				+3.14
				+2.33
				+0.27
				+0.53
				+0.20
				+0.13
				+0.10
				-0.020
				-0.07
				+4.20
				-0.80
				+1.67
				+0.66
				+6.20
				-3.34
				+2.33

†Outcome 1: Attained Cure Criterion vs. Did Not Attain Cure Criterion
‡Adjusted for direction: "+", = improvement and "-", = deterioration relative to the symptom measured.

APPENDIX J
COMPARISON OF PRE- AND POST-TREATMENT SCORES
ACCORDING TO WETTING FREQUENCY AT WEEK #14 (N = 36)

Variable†	> 50% of Baseline (n=19)			≤ 50% of Baseline (n=7)			0% (n=10)		
	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff
Piers-Harris	60.00	62.42	+2.42	52.57	59.43	+6.86	63.40	66.30	+2.90
CMAS Anxiety	10.68	10.00	+0.68	13.14	8.57	+4.57	9.10	6.30	+2.80
BPC Total Score	16.26	17.50	-1.24	12.28	9.00	+3.28	9.60	7.70	+1.90
BPC Conduct Problem	6.84	7.17	-0.33	4.86	4.14	+0.72	4.20	4.50	-0.30
BPC Personality Prob.	4.21	4.28	-0.07	2.86	2.43	+0.43	2.00	1.10	+0.90
BPC Inadeq.-Immatur.	1.79	1.89	-0.10	1.29	0.71	+0.58	0.90	0.90	0.00
BPC Socialized Delin.	0.11	0.44	-0.33	0.57	0.29	+0.28	0.10	0.10	0.00
Enuresis Nuisance	16.36	16.52	+0.16	12.42	15.71	+2.29	18.00	17.00	-1.00
Enuresis Tolerance	1.94	2.14	-0.20	2.23	1.99	+0.24	1.74	1.75	-0.01
PIC Adjustment	63.32	64.68	-1.36	59.57	57.42	+2.15	54.30	54.00	+0.30
PIC Depression	56.16	56.26	-0.10	51.14	48.29	+2.85	48.20	44.60	+3.60
PIC Family	57.11	56.16	+0.95	53.29	49.29	+4.00	52.00	53.80	-1.80
PIC Delinquency	58.84	62.95	-4.11	58.42	55.86	+2.56	53.50	50.40	+3.10
PIC Withdrawal	58.26	55.84	+2.42	50.00	53.00	-3.00	49.70	47.20	+2.50
PIC Anxiety	55.47	54.21	+1.26	51.71	49.00	+2.71	52.00	46.00	+6.00
PIC Hyperactivity	52.11	55.16	-3.05	52.00	52.43	-0.43	51.50	58.70	-7.20
PIC Social Skills	53.47	54.89	-0.10	51.14	48.29	+2.85	48.20	44.60	+3.60

†Scores adjusted for direction: "+" = improvement and "-" = deterioration relative to the symptom measured.

APPENDIX K
SIGNIFICANT WITHIN-SUBJECT SPEARMAN RANK ORDER CORRELATIONS
BETWEEN WEEKLY WETTING FREQUENCY AND RESPONSES TO THIS WEEK†

Subject Number	This Week Total Score	Correlation Between Wetting Frequency and			
		Item 1	Item 2	Item 3	Item 4
1	-.61 (.02)	-.60 (.02)	N.S.	-.59 (.02)	-.48 (.07)
7	-.49 (.07)	N.S.	-.61 (.02)	N.S.	-.57 (.03)
11	N.S.	N.S.†	N.S.	-.50 (.06)	N.S.
15	-.47 (.08)	-.45 (.09)	-.50 (.06)	N.S.	+.47 (.08)
22	N.S.	N.S.	-.68 (.006)	N.S.	-.51 (.05)
23	-.69 (.004)	-.54 (.04)	-.73 (.002)	N.S.†	-.62 (.01)
25	N.S.	N.S.	-.46 (.09)	N.S.	N.S.
26	-.49 (.06)	N.S.	N.S.	N.S.	-.44 (.10)
30	N.S.	N.S.	N.S.	-.48 (.07)	N.S.
31	N.S.	-.53 (.05)	N.S.	N.S.	N.S.
35	N.S.	N.S.	-.49 (.06)	N.S.	-.57 (.03)
38	+.82 (.02)	N.S.†	N.S.†	N.S.	N.S.
42	+.68 (.01)	N.S.	+.58 (.04)	+.67 (.01)	+.54 (.05)
44	-.54 (.04)	N.S.	N.S.	-.60 (.02)	-.50 (.06)
45	N.S.	N.S.†	+.53 (.05)	N.S.	N.S.
46	N.S.	N.S.	-.44 (.10)	-.66 (.008)	N.S.

†Levels of significance are provided in parentheses.

†r = 0.00; p = 1.00

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BIOGRAPHICAL SKETCH

William G. Wagner was born on August 15, 1947, the son of J. Frank and Lois Wagner of Ligonier, Pennsylvania. Bill received his Bachelor of Science degree in music education from Indiana University of Pennsylvania in May of 1969. Following graduation he married Diane C. Wynn of Pittsburgh, Pennsylvania, and the couple moved to Vermont where they began music teaching careers in the public schools of northern Vermont. In August of 1975, Bill received a Master of Education degree in educational foundations from the University of Vermont.

After seven years of public school teaching, Bill and Diane left the frigid New England climate in search of a land of sunshine, blue skies, and warm temperatures. The couple arrived in Orlando, Florida, in the fall of 1976. Following a stint as a singing waiter at a local nightclub, Bill joined the staff of Youth Programs, Inc., a private agency devoted to the rehabilitation of young criminal offenders.

At about the same time Bill was accepted into the Ph.D. program in Counseling Psychology at the University of Florida in Gainesville, Florida. In June of 1977, when Bill and

Diane moved from Orlando to Gainesville, Bill was promoted to northern regional director for Youth Programs, Inc. He continued in this position on a half-time basis during his first three years of graduate study. During his last year in Gainesville, Bill was an intern at the University Psychological and Vocational Counseling Center. Following graduation Bill and Diane moved to Hattiesburg, Mississippi, where Bill joined the faculty of the Department of Counseling Psychology and Counselor Education at the University of Southern Mississippi.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Paul J. Wittmer, Chairperson
Professor of Counselor Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Suzanne B. Johnson
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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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Assistant Professor of Counselor
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This dissertation was submitted to the Graduate Faculty of the Department of Counselor Education in the College of Education and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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